CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
NEW CASTLE COUNTY, DELAWARE

CULVERT REPLACEMENT - CURTIS LANE

CONTRACT NO. 21-04
CURTIS LANE, NEWARK DE 19711

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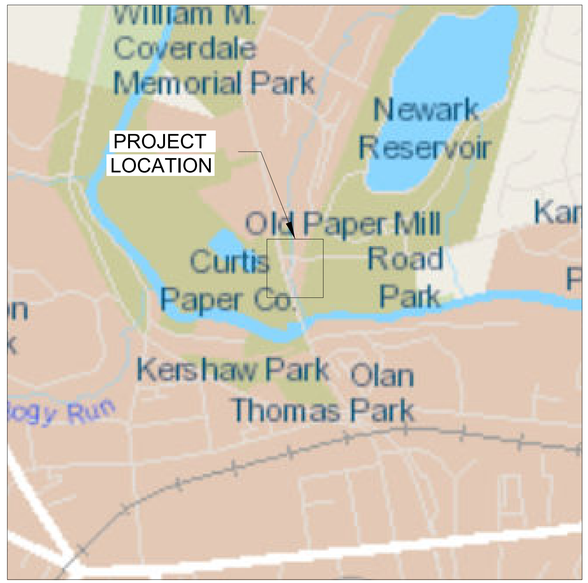

LOCATION MAP
SCALE: NOT TO SCALE

MISS UTILITY of DELMARVA
BEFORE YOU DIG CALL
1-800-282-8555 (in Del.)
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PROTECT YOURSELF, GIVE TWO WORKING DAYS NOTICE

PREPARED BY:
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
121 Continental Drive, Suite 300 Newark, DE 19713

ENGINEER SEAL
JAMES J. KELLEY — No. 12162 — DELAWARE — PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DRAWN	DATE
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PREPARED FOR:
NEWARK DELAWARE
Committed to Service Excellence
220 SOUTH MAIN STREET
302-366-7000

APPROVALS		DATE
DRAWN BY:	DEN	8-14-20
CHECKED BY:	JJK	8-14-20
ENGINEER:	JJK	8-14-20
OPERATIONS:		
REVISION:		

CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: TITLE SHEET
SCALE: NTS
DWG NO. 1
SHEET NO: 1 OF 17

GENERAL NOTES

1. PARCEL DATA
   A. TAX MAP NO. N/A
   B. SITE ADDRESS: CURTIS LANE
      NEWARK, DE 19711
   C. BENCHMARK (JMT1 – TRAV):
      NORTHING = 615943.49
      EASTING = 562616.81
   ELEVATION = 66.96
   D. TOTAL SITE AREA (PER DEED PLOT)= N/A
   E. SINGLE LOT
   F. APPROX. TOTAL LIMIT OF DISTURBANCE = 0.24 ACRES

2. EXISTING BOUNDARY AND TOPOGRAPHICAL DATA IS BASED ON A SITE SURVEY PERFORMED BY JMT IN JUNE OF 2020. SURVEY CONTROLS ARE BASED ON THE DELAWARE COORDINATE SYSTEM HORIZONTAL NAD 83/91 AND VERTICAL NAVD 88. SEE SURVEY DATA IN SURVEY GENERAL NOTES, THIS SHEET.

3. ALL SURVEY AND STAKE–OUT WORK SHALL BE PERFORMED BY A LAND SURVEYOR LICENSED IN THE STATE OF DELAWARE.

4. ALL ELEVATIONS ARE IN FEET.

5. CONTRACTOR SHALL NOTIFY MISS UTILITY OF DELAWARE 72 HOURS BEFORE START OF CONSTRUCTION AND BEFORE DIGGING. CALL 1(800) 282–8555.

6. CONTRACTOR SHALL NOTIFY TIM FILASKY PE, CITY OF NEWARK PUBLIC WORKS AND WATER RESOURCES DIRECTOR AT 302–366–7000 AT LEAST 72 HOURS BEFORE START OF CONSTRUCTION.

7. UNLESS OTHERWISE NOTED AND AS APPLICABLE TO THE WORK, ALL CONSTRUCTION, MATERIALS, AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE:

   A. CITY OF NEWARK DELAWARE MUNICIPAL CODE
   B. CITY OF NEWARK DEPARTMENT OF PUBLIC WORKS AND WATER RESOURCES WATER AND WASTEWATER STANDARDS AND SPECIFICATIONS.
   C. CITY OF NEWARK STANDARD SPECIFICATIONS FOR ROAD AND UTILITY CONSTRUCTION, DETAILS AND SUPPLEMENTS.
   D. DELAWARE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS AND DETAILS
   E. DELAWARE SEDIMENT AND STORMWATER REGULATIONS (SEE EROSION AND SEDIMENT CONTROL NOTE 1).

8. WHERE REFERENCES ARE MADE TO STANDARDS, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO HAVE IN ITS POSSESSION THE LATEST UP–TO–DATE STANDARDS AS OF THE DATE OF ADVERTISEMENT OF THIS PROJECT.

9. ALL AREAS DISTURBED BY THE CONTRACTOR, WHETHER DISTURBED DIRECTLY OR INDIRECTLY BY THE CONSTRUCTION OR OTHER ACTIVITIES RELATED TO THE PERFORMANCE OF THIS PROJECT, SHALL BE RETURNED TO EQUAL OR BETTER THAN THE ORIGINAL CONDITION PRIOR TO FINAL ACCEPTANCE OF THE WORK. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT ALL EXISTING UTILITIES, CURBS, SIDEWALK, PAVING, SHRUBS, FENCING, ETC. ANY AND ALL DAMAGE DONE TO SAME SHALL BE IMMEDIATELY AND COMPLETELY REPAIRED AT CONTRACTOR'S EXPENSE.

10. UNLESS NOTED OTHERWISE, ALL MATERIALS SALVAGED DURING DEMOLITION AND CONSTRUCTION SHALL BECOME THE CONTRACTOR'S PROPERTY AND SHALL BE DISPOSED OF OFF–SITE IN A LAWFUL LOCATION AND MANNER. ALL FEES ASSOCIATED WITH OFF–SITE DISPOSAL SHALL BE PAID BY THE CONTRACTOR.

11. TEMPORARY EROSION AND SEDIMENT CONTROLS SHALL BE INSTALLED, MONITORED, AND MAINTAINED BY THE CONTRACTOR IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLANS INCLUDED HEREIN.

12. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH HAVE OCCURRED BY HIS/HER FAILURE NOT TO EXACTLY LOCATE AND PRESERVE ANY AND ALL EXISTING UTILITIES, STRUCTURES AND OTHER FEATURES AFFECTING HIS/HER WORK. ITEMS SHALL BE REPLACED WITH THE SAME TYPE OF MATERIAL THAT WAS REMOVED OR DAMAGED DURING CONSTRUCTION OR AS DIRECTED BY THE ENGINEER.

13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE LOCATION AND ACTIVITIES OF HIS FORCES WITH THE OWNER, AND ABUTTING PROPERTY OWNERS TO MINIMIZE INTERFERENCE WITH EXISTING UTILITIES, PEDESTRIAN TRAFFIC, AND PROPERTY ACCESS. PEDESTRIAN AND VEHICLE ACCESS SHALL BE MAINTAINED AT ALL TIMES.

14. THE PLANS AND SPECIFICATIONS DO NOT INCLUDE PROVISIONS FOR CONSTRUCTION SAFETY. A HEALTH AND SAFETY PLAN MUST BE DEVELOPED BY CONTRACTOR PRIOR TO STARTING WORK.

15. METHODS, PROCEDURES AND THE SEQUENCES OF CONSTRUCTION (OTHER THAN THAT NOTED ON THE DRAWINGS) ARE THE RESPONSIBILITY OF THE CONTRACTORS(S).

16. THE CONTRACTOR SHALL KEEP ROADWAYS CLEAN AT ALL TIMES. ALL SOIL SPILLED, DROPPED, WASHED OR TRACKER ONTO ROADWAYS OR OTHER IMPERVIOUS SURFACES MUST BE REMOVED IMMEDIATELY BY CONTRACTOR.

17. THE CONTRACTOR SHALL AT ALL TIMES MAINTAIN A JOBSITE FREE OF LITTER AND TRASH. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEWING THE SITE AT THE END OF THE DAY TO CLEAN UP ANY TRASH OR LITTER GENERATED BY THE PERSONNEL AND SUBCONTRACTORS WORKING FOR THE CONTRACTOR AND DISPOSE OF DEBRIS PROPERLY.

EROSION AND SEDIMENT CONTROL GENERAL NOTES

1. THE CITY OF NEWARK PUBLIC WORKS AND WATER RESOURCES DEPARTMENT SHALL BE NOTIFIED IN WRITING 5 DAYS PRIOR TO COMMENCING WITH CONSTRUCTION. FAILURE TO DO SO CONSTITUTES A VIOLATION OF THE APPROVED SEDIMENT AND STORMWATER MANAGEMENT PLAN.

2. REVIEW AND/OR APPROVAL OF THE SEDIMENT AND STORMWATER MANAGEMENT PLAN SHALL NOT RELIEVE THE CONTRACTOR FROM HIS OR HER RESPONSIBILITIES FOR COMPLIANCE WITH THE REQUIREMENTS OF THE DELAWARE SEDIMENT AND STORMWATER REGULATIONS, NOR SHALL IT RELIEVE THE CONTRACTOR FROM ERRORS OR OMISSIONS IN THE APPROVED PLAN.

3. IF THE APPROVED PLAN NEEDS TO BE MODIFIED, ADDITIONAL SEDIMENT AND STORMWATER CONTROL MEASURES MAY BE REQUIRED AS DEEMED NECESSARY BY DNREC OR THE CITY OF NEWARK.

4. FOLLOWING SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED FOR ALL PERIMETER SEDIMENT CONTROLS, SOIL STOCKPILES, AND ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE WITHIN 14 CALENDAR DAYS UNLESS MORE RESTRICTIVE FEDERAL REQUIREMENTS APPLY.

5. ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL COMPLY WITH THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.

6. AT ANY TIME A DEWATERING OPERATION IS USED, IT SHALL BE PREVIOUSLY APPROVED BY THE AGENCY CONSTRUCTION SITE REVIEWER FOR A NON–EROSIVE POINT OF DISCHARGE, AND A DEWATERING PERMIT SHOULD BE APPROVED BY THE DNREC WELL PERMITTING BRANCH.

7. APPROVED PLANS REMAIN VALID FOR 5 YEARS FROM THE DATE OF APPROVAL.

8. POST CONSTRUCTION VERIFICATION DOCUMENTS SHALL BE SUBMITTED TO THE CITY OF NEWARK PUBLIC WORKS AND WATER RESOURCES DEPARTMENT WITHIN 60–DAYS OF COMPLETION.

9. THE OWNER SHALL BE FAMILIAR WITH AND COMPLY WITH ALL ASPECTS OF THE NPDES CONSTRUCTION GENERAL PERMIT ASSOCIATED WITH THE PROJECT, INCLUDING, BUT NOT LIMITED TO, PERFORMING WEEKLY SITE INSPECTIONS DURING CONSTRUCTION AND AFTER RAIN EVENTS, AND MAINTAINING WRITTEN LOGS OF THESE INSPECTIONS.

10. THE CONTRACTOR SHALL AT ALL TIMES PROTECT AGAINST SEDIMENT OR DEBRIS LADEN RUNOFF OR WIND FROM LEAVING THE SITE. PERIMETER CONTROLS SHALL BE CHECKED DAILY AND ADJUSTED OR REPAIRED TO FULLY CONTAIN AND CONTROL SEDIMENT FROM LEAVING THE SITE. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT HAS REACHED HALF OF THE EFFECTIVE CAPACITY OF THE CONTROL. IN ADDITION, THE CONTRACTOR MAY NEED TO ADJUST OR ALTER MEASURES IN TIMES OF ADVERSE WEATHER CONDITIONS, OR AS DIRECTED BY THE AGENCY CONSTRUCTION SITE REVIEWER.

11. BEFORE ANY EARTHWORK OR EXCAVATION TAKES PLACE, THE CONTRACTOR SHOULD CALL MISS UTILITY AT 811 OR 1–800–282–8555 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION, TO HAVE ALL EXISTING UTILITIES MARKED ONSITE.

12. BEST AVAILABLE TECHNOLOGY (BAT) SHALL BE EMPLOYED TO MANAGE TURBID DISCHARGES IN ACCORDANCE WITH REQUIREMENTS OF 7 DEL.C.CH.60 AND THE CURRENT DELAWARE CONSTRUCTION GENERAL PERMIT (CGP).

13. DOCUMENTATION OF SOIL TESTING AND MATERIALS USED FOR TEMPORARY OR PERMANENT STABILIZATION INCLUDING BUT NOT LIMITED TO SOIL TEST RESULTS, SEED TAGS, SOIL AMENDMENT TAGS, ETC. SHALL BE PROVIDED TO THE CITY OF NEWARK PUBLIC WORKS AND WATER RESOURCES DEPARTMENT TO VERIFY THAT THE PERMANENT OR TEMPORARY STABILIZATION HAS BEEN COMPLETED IN ACCORDANCE WITH THE APPROVED PLAN.

14. THE CITY OF NEWARK MAY REQUIRE ADDITIONAL SOIL TESTING AND REAPPLICATION OF PERMANENT OR TEMPORARY STABILIZATION IN ACCORDANCE WITH THE SPECIFICATIONS IN THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, OR ALTERNATIVE MEASURES THAT PROVIDE FUNCTIONAL EQUIVALENCY.

THE FOLLOWING IS A SUGGESTED CONSTRUCTION SEQUENCE FOR THE WORK. THE CONTRACTOR MAY DEVELOP HIS/HER OWN CONSTRUCTION SEQUENCE. IF PROPOSED SEQUENCE DIFFERS THAN AS SHOWN, SUBMIT TO THE ENGINEER AND THE CITY FOR REVIEW AND APPROVAL PRIOR TO THE START OF WORK.

SEQUENCE OF CONSTRUCTION

1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO CITY AND ENGINEER FOR REVIEW AND APPROVAL.

2. PRIOR TO ANY CLEARING, INSTALLATION OF SEDIMENT CONTROL MEASURES OR GRADING, A PRE–CONSTRUCTION MEETING MUST BE SCHEDULED AND CONDUCTED WITH THE CITY OF NEWARK CONSTRUCTION SITE REVIEWER. CONTRACTOR AND CERTIFIED CONSTRCUTION REVIEWER ARE REQUIRED TO BE IN ATTENDANCE AT THE PRE–CONSTRUCTION MEETING; THE DESIGNER IS RECOMMENDED TO ATTEND.

3. BEFORE ANY EARTHWORK OR EXCAVATION TAKES PLACE, THE CONTRACTOR SHOULD CALL MISS UTILITY AT 811 OR 1–800–282–8555 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION, TO HAVE ALL EXISTING UTILITIES MARKED ONSITE.

4. MAILBOXES/MAIL SERVICES SHALL BE TEMPORARILY RELOCATED OUT OF THE WORK ZONE DURING CONSTRUCTION. PAYMENT SHALL BE INCIDENTAL TO CLEARING AND GRUBBING.

5. CLEAR AND GRUB AREAS IN WHICH CONSTRUCTION AND/OR INSTALLATION OF EROSION AND SEDIMENT CONTROL DEVICES ARE SPECIFIED. INSTALL PERIMETER CONTROL MEASURES INCLUDING SILT FENCE. ALL ACTIVITIES SHALL BE CONDUCTED WITHIN THE SPECIFIED LIMIT OF CONSTRUCTION.

6. ALL PERIMETER CONTROLS ARE TO BE REVIEWED BY THE AGENCY CONSTRUCTION SITE REVIEWER AND APPROVED PRIOR TO PROCEEDING WITH FURTHER SITE DISTURBANCE OR CONSTRUCTION.

7. THE CONTRACTOR SHALL AT ALL TIMES PROTECT AGAINST SEDIMENT OR DEBRIS LADEN RUNOFF OR WIND FROM LEAVING THE SITE. PERIMETER CONTROLS SHOULD BE CHECKED DAILY AND ADJUSTED AND/OR REPAIRED TO FULLY CONTAIN AND CONTROL SEDIMENTATION ON THE SITE. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT HAS REACHED HALF OF THE EFFECTIVE CAPACITY OF THE CONTROL. IN ADDITION, THE CONTRACTOR MAY NEED TO ADJUST OR REPAIR MEASURES IN TIMES OF ADVERSE WEATHER CONDITIONS, OR AS DIRECTED BY THE AGENCY CONSTRUCTION SITE REVIEWER.

8. CONTRACTOR SHALL TEST PIT ALL BELOW GROUND UTILITIES WITHIN THE CONSTRUCTION AREA TO VERIFY LOCATION AND INVERT PRIOR TO CONSTRUCTIN THE PROPOSED STORM DRAIN SYSTEM.

9. PLACE SANDBAG STREAM DIVERSION AS SHOWN ON PLANS. REFER TO EROSION AND SEDIMENT CONTROL SHEETS FOR MORE DETAILS.

10. UTILITY POLES WITHIN WORK ZONE SHALL BE TEMPORARILY SUPPORTED DURING EXCAVATION AND BACKFILL OPERATIONS AS DETERMINED BY THE ENGINEER. PAYMENT SHALL BE INCIDENTAL TO CULVERT ITEMS.

11. REMOVE EXISTING CMP CULVERTS AND CATCH BASIN MAINTAINING STREAM FLOW AT ALL TIMES.

12. INSTALL NEW HEADWALLS AND CONCRETE CULVERTS. HEADWALL MAY BE PRECAST OR CAST IN PLACE.

13. ADD FILL AND GRADE AREA ABOVE AND ON SIDE OF NEWLY INSTALLED CULVERTS. STABILIZED EMBANKMENT WITH TOPSOIL, SEED AND MATTING.

14. REMOVE ANY ACCUMULATED SILT, EXCAVATE AND INSTALL RIRRAP OUTLET PROTECTION.

15. REPAIR OR REPLACE ROADWAY, CURB AND SIDEWALK DAMAGED OR REMOVED DURING THE WORK IN ACCORDANCE WITH THE PLANS AND APPLICABLE STANDARDS.

16. MILL AND OVERLAY CURTIS LANE.

17. RESET MAILBOXES TO PREVIOUS LOCATIONS.

18. EROSION AND SEDIMENT CONTROL DEVICES SHOULD BE REMOVED ONLY AFTER WORK IN THE AREA HAS BEEN COMPLETED AND STABILIZED WITH WRITTEN APPROVAL FROM THE AGENCY CONSTRUCTION SITE REVIEWER.

19. THE TERMINATION OF THE CONSTRUCTION WORK WILL REQUIRE SUBMISSION AND ACCEPTANCE OF THE POST CONSTRUCTION VERIFICATION DOCUMENTS, INCLUDING FINAL STABILIZATION THROUGHOUT THE SITE, ALL ELEMENTS OF THE EROSION AND SEDIMENT CONTROL PLAN IMPLEMENTED, AND ACCEPTANCE OF THE FINAL OPERATION AND MAINTENANCE PLAN.

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302–366–7000

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DRAWN BY:	DEN	8–14–20
CHECKED BY:	JJK	8–14–20
ENGINEER:	JJK	8–14–20
OPERATIONS:		
REVISION:		

CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: GENERAL NOTES
SCALE: NTS
DWG NO. 2
SHEET NO: 2 OF 17

EXISTING SYMBOLS

DRAINAGE	
—∞—	DITCH OR STREAM CENTERLINE
	DIRECTIONAL STREAM FLOW ARROW
D.I.	DRAINAGE INLET
J.B.	DRAINAGE JUNCTION BOX
Ⓓ	DRAINAGE MANHOLE
SIZE/TYPE LABEL	DRAINAGE PIPE AND FLOW ARROW
	DRAINAGE PIPE HEADWALL
	RIPRAP - AREA FEATURE
	RIPRAP - LINEAR FEATURE

MANMADE ROADSIDE FEATURES	
	BOLLARD - STEEL POLE
⊠	BOLLARD - WOOD POST
(TYPE LABEL)	CURB
(TYPE LABEL)	CURB AND GUTTER
	FENCE - CHAINLINK OR STRANDED
	FENCE - STOCKADE OR SPLIT RAIL
	FLAG POLE
	GUARDRAIL - STEEL BEAM
	GUARDRAIL - WIRE ROPE
LAMP	LAMP AND POST - RESIDENTIAL
	MAILBOX
	PARKING METER AND POST
	PAVEMENT - FLEXIBLE
	PAVEMENT - RIGID
□	PILE - BRIDGE
○	PILLAR OR MISCELLANEOUS POST
	TRAFFIC SIGN AND POST
	WALL - BRICK OR BLOCK
	WALL - STONE

NATURAL ROADSIDE FEATURES	
	GRASS LAWN
	HEDGEROW OR THICKET
	MARSH BOUNDARY LINE
	TREE - CONIFEROUS
	TREE - DECIDUOUS
	TREE STUMP
	SHRUBBERY
WL	DELINEATED WETLAND BOUNDARY LINE
	WOODS LINE BOUNDARY

RIGHT-OF-WAY SYMBOLS	
	PROPERTY MARKER - CONCRETE MON.
	PROPERTY MARKER - IRON PIPE
100+00	HISTORIC RIGHT-OF-WAY BASELINE
	EXISTING RIGHT-OF-WAY
PE	EXISTING PROPERTY LINE
EASEMENT TYPE	EXISTING EASEMENT
DA	EXISTING DENIAL OF ACCESS
R/W-DA	EXISTING R/W & DENIAL OF ACCESS

SURVEY CONTROL & MONUMENTATION	
	SURVEY BENCHMARK LOCATION
	SURVEY TIE POINT LOCATION
	SURVEY TRAVERSE POINT
	POINT OF CURVATURE OR TANGENCY
	POINT OF INTERSECTING TANGENTS

UTILITY	
	SOIL BORING LOCATION
	UTILITY TEST HOLE LOCATION
TV	CABLE TV DISTRIBUTION BOX
Ⓔ	ELECTRIC MANHOLE
EM	ELECTRIC METER
E	ELECTRIC TRANSFORMER
	POLE MOUNTED LUMINAIRE
Ⓖ	GAS MANHOLE
G.M.	GAS METER
G.V.	GAS VALVE
G.P.	GAS PUMP - SERVICE STATION
	RAILROAD TRACKS
Ⓢ	SANITARY SEWER MANHOLE
S.V.	SANITARY SEWER VALVE
VENT	SANITARY SEWER VENT OR CLEANOUT
S.D.F.	SEPTIC DRAIN FIELD
B	TELEPHONE BOOTH
Ⓣ	TELEPHONE MANHOLE
T	TELEPHONE TEST POINT
	TRAFFIC - CONDUIT JUNCTION WELL
	TRAFFIC - LIGHT POLE AND BASE
	TRAFFIC - PEDESTRIAN POLE & BASE
	TRAFFIC - SIGNAL CABINET & BASE
⊗	TRAFFIC - SIGNAL POLE AND BASE
U	UTILITY BOX
	UTILITY POLE GUY WIRE ANCHOR
	UTILITY POLE
F.H.	WATER - FIRE HYDRANT
W.M.	WATER METER
W.V.	WATER VALVE
WELL	WELL HEAD
	MANHOLE - UNDETERMINED OWNER

UTILITY COMPANY FACILITIES	
CON W	CITY OF NEWARK WATER
CON SS	CITY OF NEWARK SANITARY SEWER
CON E	CITY OF NEWARK ELECTRIC
DP G	DELMARVA POWER - GAS
DP E	DELMARVA POWER - ELECTRIC
DOT E DUCT	DELDOT ELECTRICAL CONDUIT
VER E	VERIZON COMMUNICATION

MISCELLANEOUS	
SWM WL SWM	STATE MAPPED WETLAND LINE
	CASING PIPE

PROPOSED SYMBOLS

CONSTRUCTION	
	CONCRETE SAFETY BARRIER - PERMANENT
	BOLLARD - STEEL POLE
⊠	BOLLARD - WOOD POST
	BRICK PATTERNED SURFACE
	BUTT JOINT
100+00	CONSTRUCTION BASELINE
CSF	CONSTRUCTION SAFETY FENCE
	CURB, TYPE 1 & TYPE 3
	CURB, TYPE 2
	CURB & GUTTER, TYPE 1
	CURB & GUTTER, TYPE 2
	CURB & GUTTER, TYPE 3
	CURB & GUTTER, TYPE 4
	CLEAR ZONE
■	DRAINAGE INLET
	DITCH
	FENCE - METAL
	FENCE - WOOD
	FLARED END SECTION
	GUARDRAIL, TYPE 1
	GUARDRAIL, TYPE 2
	GUARDRAIL, TYPE 3
	GUARDRAIL END ANCHORAGE
	GUARDRAIL END TREATMENT, TYPE 1
	GUARDRAIL END TREATMENT, TYPE 2
	GUARDRAIL END TREATMENT, TYPE 3
	HEADWALL
	HORIZONTAL CLEARANCE
	IMPACT ATTENUATOR
	LIMIT OF CONSTRUCTION
●	MANHOLE
	PAVEMENT PATCH
	PAVEMENT REMOVAL - TOPSOIL, SEED AND MULCH
	PIPE & DIRECTIONAL FLOW ARROW
	P.C.C. SIDEWALK @ 4"
	P.C.C. SIDEWALK @ 6"
	RIPRAP
TSD	TEMPORARY SLOPE DRAIN
	UNDERDRAIN

RIGHT-OF-WAY SYMBOLS	
⊠	PROPOSED RIGHT-OF-WAY MONUMENT
DA	PROPOSED DENIAL OF ACCESS
PE	PROPOSED PERMANENT EASEMENT
R/W	PROPOSED RIGHT-OF-WAY
R/W-DA	PROPOSED R/W & DENIAL OF ACCESS
TCE	TEMPORARY CONSTRUCTION EASEMENT
100+00	PROPOSED RIGHT-OF-WAY BASELINE

IDENTIFIERS	
AB D	ABANDON BY OTHERS
A C	ADJUST BY CONTRACTOR
A O	ADJUST BY OTHERS
AB C	ABANDON BY CONTRACTOR
B	CONCRETE SAFETY BARRIER
C	CURB OR CURB & GUTTER
CoJB	CONVERT TO JUNCTION BOX
CMH	CONVERT TO DRAINAGE MANHOLE
C O	CURB OPENING
PC	PEDESTRIAN CONNECTION / TYPE
PC-N	PEDESTRIAN CONNECTION / TYPE - WITHOUT SIDEWALK SURFACE DETECTABLE WARNING SYSTEM
CSF	CONSTRUCTION SAFETY FENCE
DI	DRAINAGE INLET
DND	DO NOT DISTURB
ED	ENERGY DISSIPATOR
F	FENCE
FES	FLARED END SECTION
FT C	FILL WITH FLOWABLE FILL
FS	FILTRATION STRUCTURE
GR	GUARDRAIL
JB	JUNCTION BOX
MH	MANHOLE
M	MONUMENT - RIGHT-OF-WAY
P	PIPE
RL C	RELOCATE BY CONTRACTOR
RL O	RELOCATE BY OTHERS
RM C	REMOVE BY CONTRACTOR
RM O	REMOVE BY OTHERS
RM TC	REMOVE BY TRAFFIC CONTRACTOR
RR	RIPRAP
SES XXX	SAFETY END SECTION
UD	UNDERDRAIN / LENGTH
UDO	UNDERDRAIN OUTLET PIPE
UDC	UNDERDRAIN CLEANOUT

PAVEMENT SECTION(S)	
	MILL AND OVERLAY PAVEMENT - SEE CONSTRUCTION DETAILS FOR MATERIALS AND DEPTHS
	RECONSTRUCTED PAVEMENT - SEE CONSTRUCTION DETAILS FOR MATERIALS AND DEPTHS

EROSION & SEDIMENT CONTROL	
CFL	COMPOST FILTER LOG
CFL	COMPOST FILTER LOG / LENGTH
CIP	CULVERT INLET PROTECTION
DWBAG	DEWATERING BAG
DWB	DEWATERING BASIN
ED	EARTH DIKE
	INLET SEDIMENT CONTROL
	PERIMETER DIKE/SWALE
PST	PORTABLE SEDIMENT TANK
SBD	SANDBAG DIKE
SB	SANDBAG DIVERSION
ST	SEDIMENT TRAP
ST	SEDIMENT TRAP
ST	SEDIMENT TRAP WITH INLET AS OUTLET
ST	SEDIMENT TRAP PIPE OUTLET
SF	SILT FENCE / LENGTH
SF	SILT FENCE
RSF	SILT FENCE - REINFORCED / LENGTH
RSF	SILT FENCE - REINFORCED
SSF	SILT FENCE - SUPER / LENGTH
SSF	SILT FENCE - SUPER
SCE	STABILIZED CONSTRUCTION ENTRANCE
SW	STILLING WELL
	STONE CHECK DAM
SP	SUMP PIT
	TEMPORARY SWALE
TSD	TEMPORARY SLOPE DRAIN
T XXX	TURBIDITY CURTAIN / LENGTH
T	TURBIDITY CURTAIN

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SHEET TITLE: LEGEND

SCALE: NTS

SHEET NO: 3 OF 17

DWG NO. 3

J.M.T. SURVEY TRAVERSE CONTROL COORDINATE TABLE

POINT	NORTHING	EASTING	ELEV.	DESCRIPTION
PID1	616057.06	562501.49	71.13	TRAV
JMT1	615943.49	562616.81	66.96	TRAV
JMT2	616141.91	562653.57	70.57	TRAV

NOTES:
1. UTILITIES ARE SHOWN AT APPROXIMATE LOCATIONS. CONTRACTOR SHALL CONFIRM UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
2. PROPERTY LINES ARE SHOWN AT APPROXIMATE LOCATIONS.

N

2 STORY WOOD HOUSE
2 STORY BRICK HOUSE
2 STORY WOOD HOUSE
PORCH
STEPS
E/PLANTER
HOTMIX
CON-E
DP-G
DIR.
CON-SS
12" STEEL INV.EL.=61.02'
12" STEEL INV.EL.=61.17'
CURB
OUTSIDE EDGE OF RIPRAP/CONC. MIXTURE
CURTIS LANE
NO PARKING
JMT TRAV PT. JMT2
OLD PAPER MILL ROAD
DELMARVA #429604443
SPEED LIMIT
29"x45" RCP INV. EL.=65.68'
29"x45" RCP INV. EL.=65.43'
29"x45" RCP INV. EL.=65.42'
29"x45" RCP INV. EL.=65.32'
JENNY'S RUN
16" MAPLE
26" MAPLE
6" ELM
36" MAPLE
CON-W
DP-E
NEWARK CITY COUNCIL
NEWARK RESERVOIR
#429520-41444
GRASS
CONC. WALK
SOLID WHITE LINE
DASHED WHITE LINE
PAPER MILL ROAD
12" STEEL INV. EL.=59.76'
57"x38" CMP INV. EL.=61.50'
57"x38" CMP INV. EL.=60.56'
12" STEEL INV. EL.=59.83'
14" ELM
18" OAK
6" ELM
#42959-41420
WASHOUT AREA
JMT TRAV PT. JMT1
57"x38" CMP INV. EL. =61.56'
57"x38" CMP INV. EL. =61.82'
57"x38" CMP INV. EL.=60.86'
24" RCP INV. EL.=63.13'
24"W RCP INV. EL.=63.34'
#41427-42956
24" RCP INV. EL.=63.80'
18" RCP INV. EL.=64.70'
57"x38" CMP INV. EL.=61.94'
NO PARKING - BRICK 2.5' X 3.5' HIGH BOLLARDS
CURB
DELDOT-C
GRAPHIC SCALE: 1"=10'

MISS UTILITY of DELMARVA
BEFORE YOU DIG CALL
1-800-282-8555 (In Del.)
1-800-441-8355 (Md., Va.)
PROTECT YOURSELF, GIVE TWO WORKING DAYS NOTICE

PREPARED BY:
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
121 Continental Drive, Suite 300 Newark, DE 19713

ENGINEER SEAL
JAMES J. KELLEY REGISTERED No. 12182 PROFESSIONAL ENGINEER DELAWARE

REV.	DESCRIPTION	DRAWN	DATE
0	–	–	–
1	–	–	–
2	–	–	–
3	–	–	–
4	–	–	–
5	–	–	–
6	–	–	–

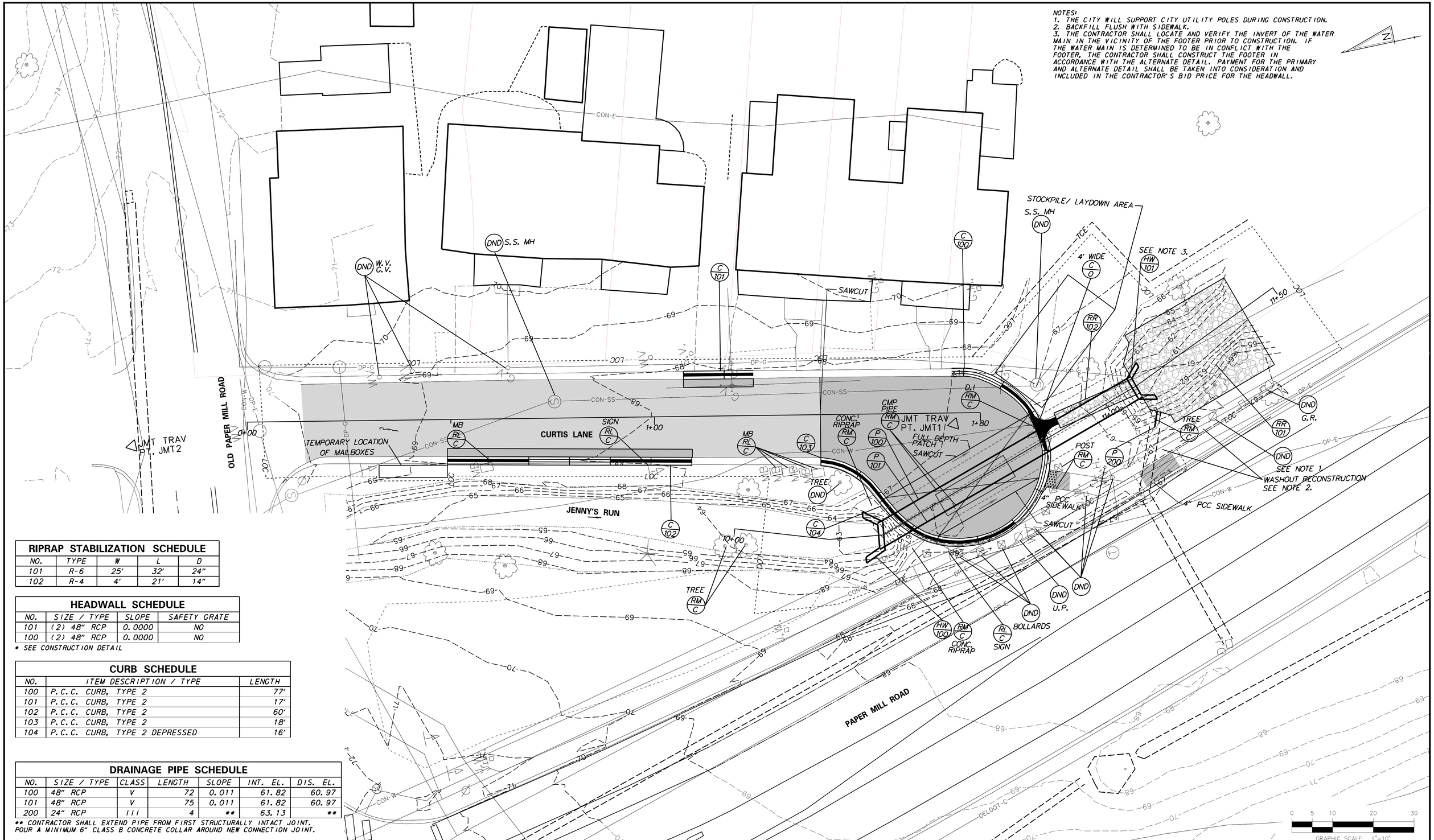
PREPARED FOR:
NEWARK DELAWARE
Committed to Service Excellence
220 SOUTH MAIN STREET
302-366-7000

APPROVALS		DATE
DRAWN BY:	DEN	8-14-20
CHECKED BY:	JJK	8-14-20
ENGINEER:	JJK	8-14-20
OPERATIONS:		
REVISION:		

CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: EXISTING SITE PLAN
SCALE: 1"=10'
SHEET NO: 4 OF 17
DWG NO. 4

NOTES:
1. THE CITY WILL SUPPORT CITY UTILITY POLES DURING CONSTRUCTION.
2. BACKFILL FLUSH WITH SIDEWALK.
3. THE CONTRACTOR SHALL LOCATE AND VERIFY THE INVERT OF THE WATER MAIN IN THE VICINITY OF THE FOOTER PRIOR TO CONSTRUCTION. IF THE WATER MAIN IS DETERMINED TO BE IN CONFLICT WITH THE FOOTER, THE CONTRACTOR SHALL CONSTRUCT THE FOOTER IN ACCORDANCE WITH THE ALTERNATE DETAIL. PAYMENT FOR THE PRIMARY AND ALTERNATE DETAIL SHALL BE TAKEN INTO CONSIDERATION AND INCLUDED IN THE CONTRACTOR'S BID PRICE FOR THE HEADWALL.



RIPRAP STABILIZATION SCHEDULE				
NO.	TYPE	W	L	D
101	R-6	25'	32'	24"
102	R-4	4'	21'	14"

HEADWALL SCHEDULE			
NO.	SIZE / TYPE	SLOPE	SAFETY GRATE
101	(2) 48" RCP	0.0000	NO
100	(2) 48" RCP	0.0000	NO

• SEE CONSTRUCTION DETAIL

CURB SCHEDULE		
NO.	ITEM DESCRIPTION / TYPE	LENGTH
100	P.C.C. CURB, TYPE 2	77'
101	P.C.C. CURB, TYPE 2	17'
102	P.C.C. CURB, TYPE 2	60'
103	P.C.C. CURB, TYPE 2	18'
104	P.C.C. CURB, TYPE 2 DEPRESSED	16'

DRAINAGE PIPE SCHEDULE						
NO.	SIZE / TYPE	CLASS	LENGTH	SLOPE	INT. EL.	DIS. EL.
100	48" RCP	V	72	0.011	61.82	60.97
101	48" RCP	V	75	0.011	61.82	60.97
200	24" RCP	III	4	**	63.13	**

** CONTRACTOR SHALL EXTEND PIPE FROM FIRST STRUCTURALLY INTACT JOINT. POUR A MINIMUM 6" CLASS B CONCRETE COLLAR AROUND NEW CONNECTION JOINT.

MISS UTILITY of DELMARVA

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1-800-441-8355 (Md., Va.)
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Engineering A Brighter Future®
121 Continental Drive, Suite 300 Newark, DE 19713

ENGINEER SEAL
JAMES J. KELLEY
No. 12162
DELAWARE
PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DRAWN	DATE
0	–	–	–
1	–	–	–
2	–	–	–
3	–	–	–
4	–	–	–
5	–	–	–
6	–	–	–

PREPARED FOR:
NEWARK DELAWARE
Committed to Service Excellence
220 SOUTH MAIN STREET
302-366-7000

APPROVALS		DATE
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ENGINEER:	JJK	8-14-20
OPERATIONS:		
REVISION:		

CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: SITE RESTORATION PLAN
SCALE: 1"=10'
SHEET NO: 5 OF 17
DWG NO. 5

SEE SITE RESTORATION PLAN FOR SCHEDULES

11+35.00

11+10.00

INV. 60.97'

11+50

RIPRAP, R-6

10+85.00

11+00

10+60.00

1+80

10+10.00

10+35.00

1' SEPARATION

HEADWALL
(SEE DETAIL)

24" CON-W RCP

INV. 61.82'

10+00

48" RCP

HEADWALL
(SEE DETAIL)

DP-G

DP-E

CON-SS

CON-W

CON-E

0 2.50 5 10 15

GRAPHIC SCALE: 1"=5'

MISS UTILITY
or
DELMARVA

BEFORE YOU DIG CALL
or
1-800-282-8555 (In Del.)
1-800-441-8355 (Md., Va.)
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WORKING DAYS NOTICE

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JAMES J. KELLEY
REGISTERED
No. 12162
DELAWARE
PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DRAWN	DATE
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4	–	–	–
5	–	–	–
6	–	–	–

PREPARED FOR:

NEWARK DELAWARE
Committed to Service Excellence
220 SOUTH MAIN STREET
302-366-7000

APPROVALS		DATE
DRAWN BY:	DEN	8-14-20
CHECKED BY:	JJK	8-14-20
ENGINEER:	JJK	8-14-20
OPERATIONS:		
REVISION:		

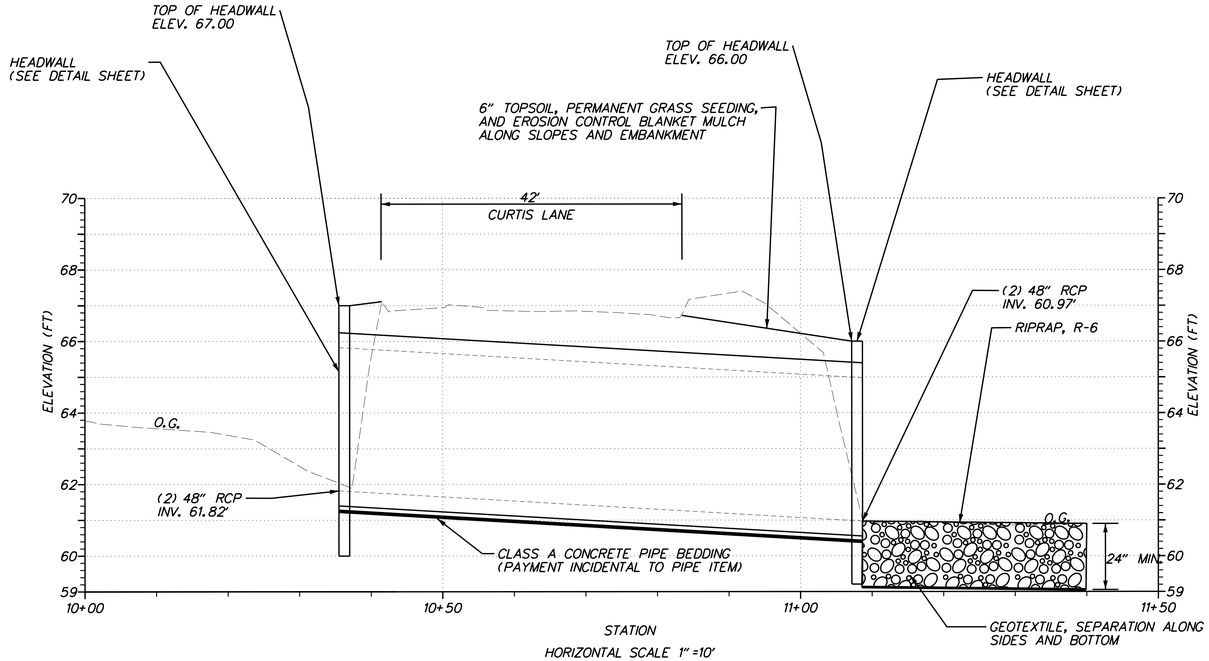
CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: CULVERT PLAN

SCALE: 1"=5'

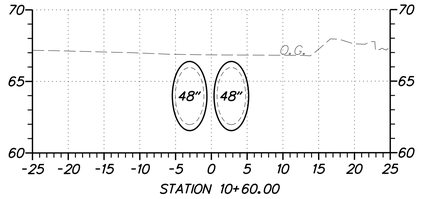
DWG NO. 6

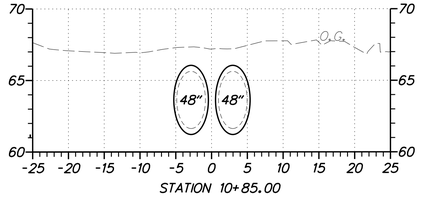
SHEET NO: 6 OF 17

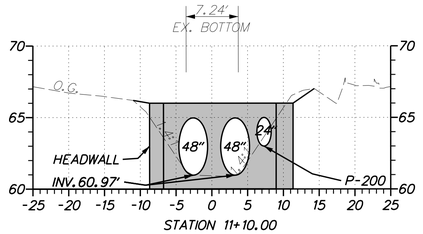


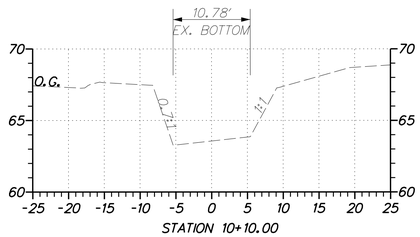
HORIZONTAL SCALE 1" =10'
VERTICAL SCALE 1" =2'

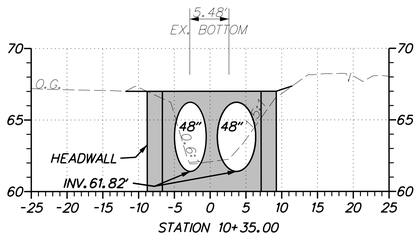
CULVERT PROFILE

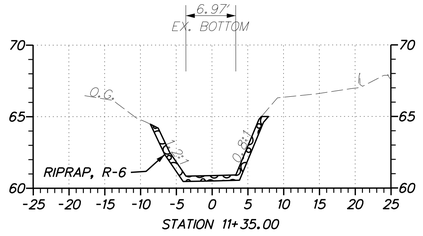












CROSS SECTIONS
HORIZONTAL SCALE 1" =10'
VERTICAL SCALE 1" =5'

MISS UTILITY or DELMARVA
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Engineering A Brighter Future®
121 Continental Drive, Suite 300 Newark, DE 19713

ENGINEER SEAL
JAMES J. KELLEY REGISTERED No. 12162 PROFESSIONAL ENGINEER DELAWARE

REV.	DESCRIPTION	DRAWN	DATE
0	–	–	–
1	–	–	–
2	–	–	–
3	–	–	–
4	–	–	–
5	–	–	–
6	–	–	–

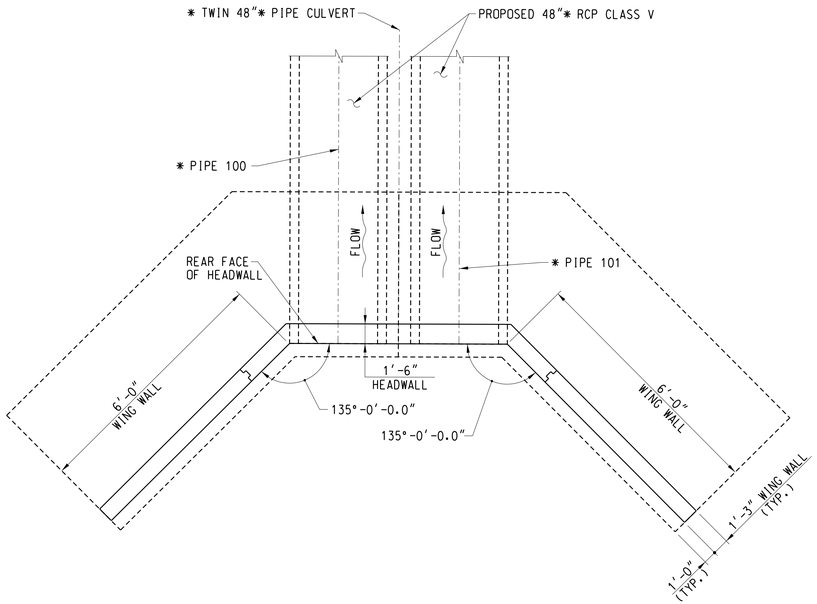
PREPARED FOR:
NEWARK DELAWARE
Committed to Service Excellence
220 SOUTH MAIN STREET
302-366-7000

APPROVALS		DATE
DRAWN BY:	DEN	8-14-20
CHECKED BY:	JJK	8-14-20
ENGINEER:	JJK	8-14-20
OPERATIONS:		
REVISION:		

CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

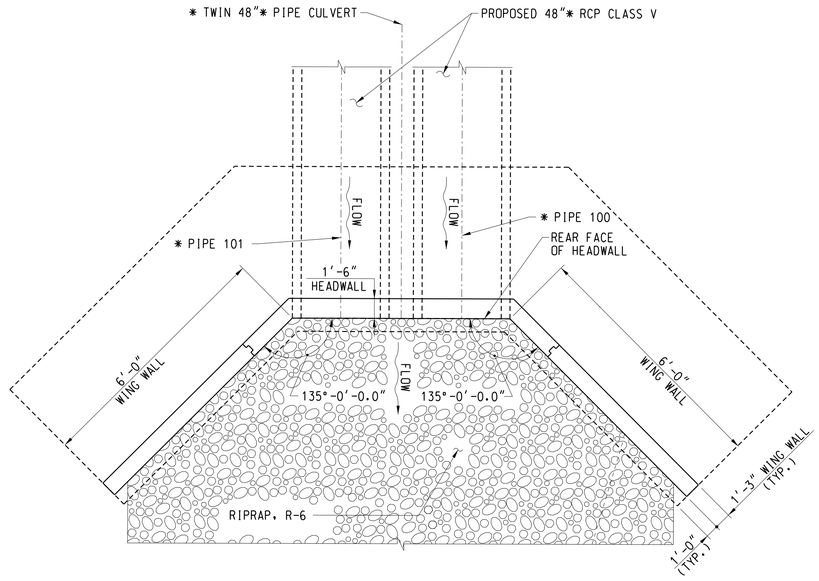
SHEET TITLE: CULVERT ELEVATION AND PROFILE

SCALE: NTS
SHEET NO: 7 OF 17
DWG NO. 7



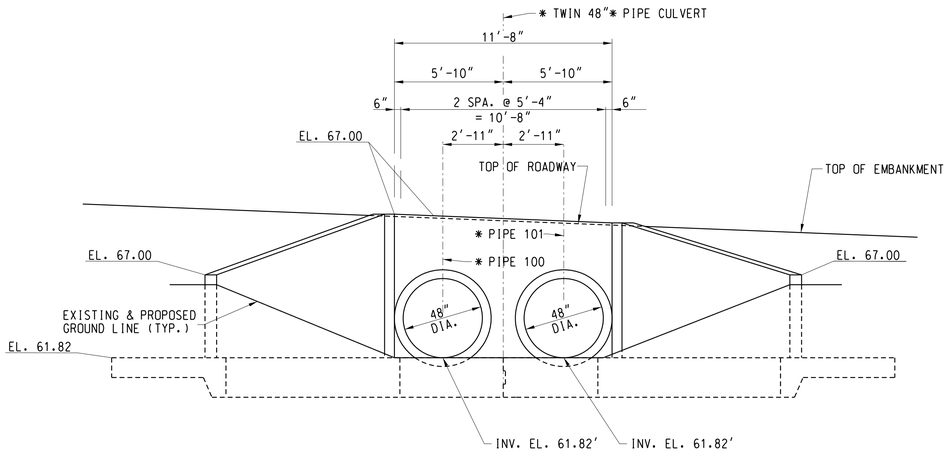
NORTH HEADWALL PLAN (UP STREAM SIDE)

NOT TO SCALE



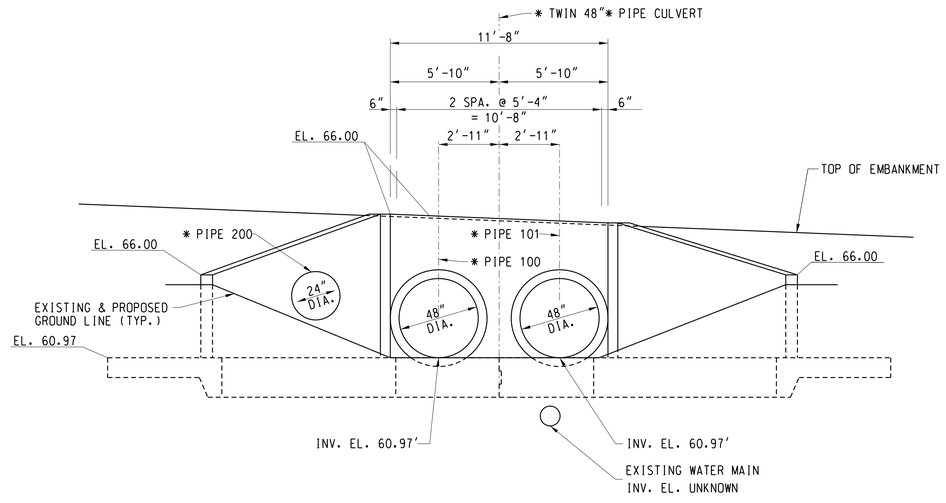
SOUTH HEADWALL PLAN (DOWN STREAM SIDE)

NOT TO SCALE



NORTH HEADWALL ELEVATION (UP STREAM SIDE)

NOT TO SCALE



SOUTH HEADWALL ELEVATION (DOWN STREAM SIDE)

NOT TO SCALE

MISS UTILITY of DELMARVA

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Engineering A Brighter Future®
121 Continental Drive, Suite 300 Newark, DE 19713

ENGINEER SEAL

JAMES J. KELLEY — REGISTERED — No. 12162 — DELAWARE — PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DRAWN	DATE
0	–	–	–
1	–	–	–
2	–	–	–
3	–	–	–
4	–	–	–
5	–	–	–
6	–	–	–

PREPARED FOR:

NEWARK DELAWARE
Committed to Service Excellence
220 SOUTH MAIN STREET
302-366-7000

APPROVALS		DATE
DRAWN BY:	DEN	8-14-20
CHECKED BY:	JJK	8-14-20
ENGINEER:	JJK	8-14-20
OPERATIONS:		
REVISION:		

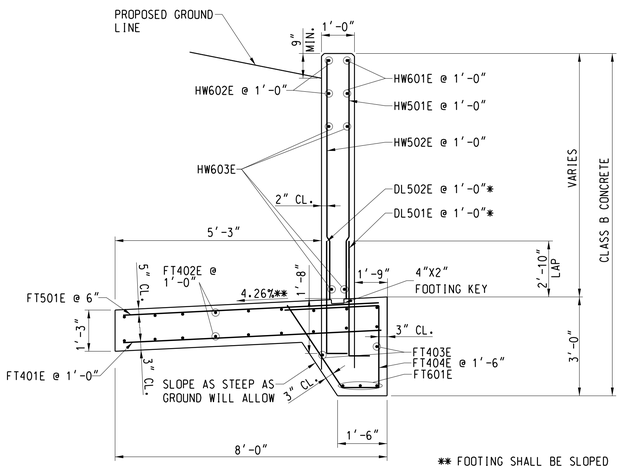
CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: HEADWALL DETAILS

SCALE: NTS

SHEET NO: 8 OF 17

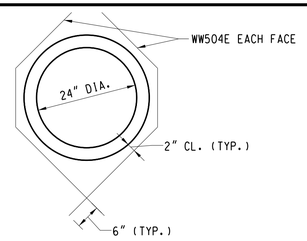
DWG NO. 8



** FOOTING SHALL BE SLOPED TO MATCH SLOPE OF PIPE.

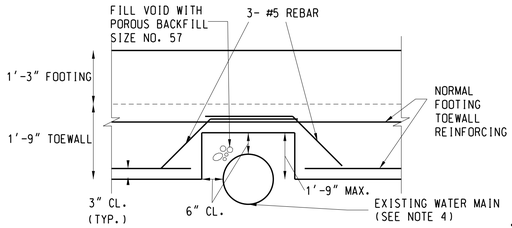
HEADWALL SECTION - BETWEEN PIPES

NOT TO SCALE



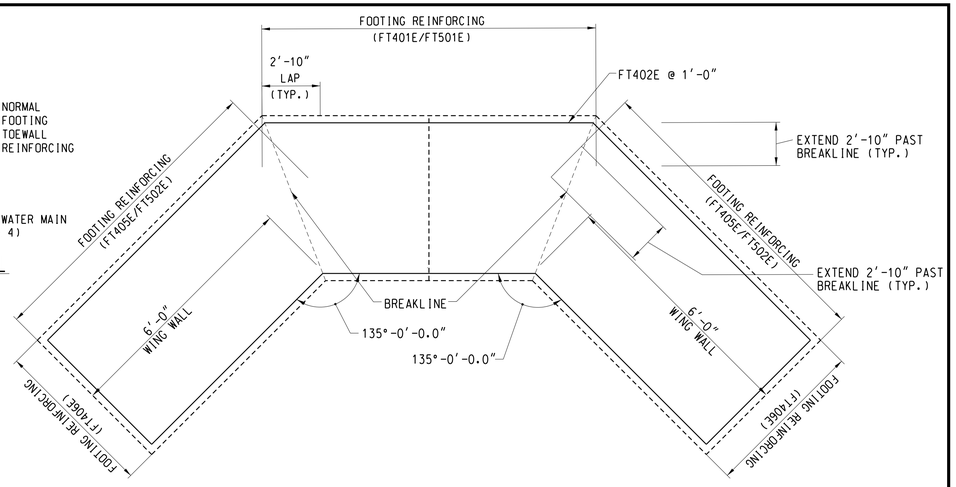
REINFORCING AT WINGWALL PIPE OPENING

NOT TO SCALE



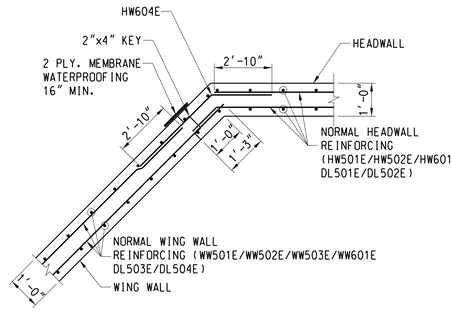
ALTERNATIVE KEY DETAIL AT WATER MAIN

NOT TO SCALE



FOOTING REINFORCING PLAN

NOT TO SCALE

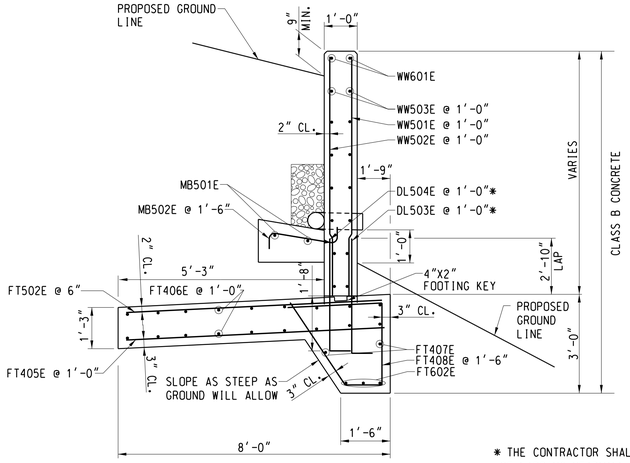


HEADWALL AND WING WALL TRANSITION DETAIL

NOT TO SCALE

NOTES:

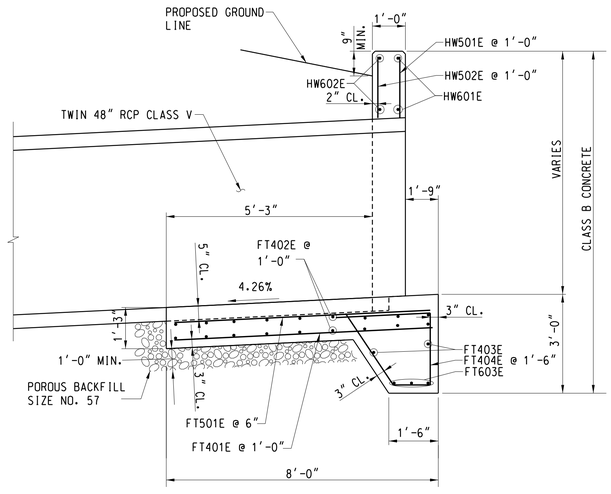
1. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60 AND SHALL BE PROTECTED WITH FUSION BONDED EPOXY.
2. WING WALL, HEADWALL AND FOOTING CONCRETE SHALL BE CLASS B.
3. SHIFT AS REQUIRED TO AVOID CONFLICT WITH EMBEDDED 48" RCP.
4. EXISTING WATER MAIN IS LOCATED BENEATH CULVERT WITH AN UNKNOWN ELEVATION. CONTRACTOR TO USE CAUTION WHEN DIGGING AROUND WATER MAIN. TEMPORARY PILE DRIVING IS NOT ALLOWED IN VICINITY OF WATER MAIN. IF WATER MAIN CONFLICTS WITH PROPOSED CULVERT FOOTING, USE THE ALTERNATIVE KEY DETAIL AT WATER MAIN.



* THE CONTRACTOR SHALL HAVE THE OPTION OF LAPPING HEADWALL/WING WALL REINFORCING WITH DOWELS AS SHOWN OR EXTENDING THE DOWELS WITH NO SPLICE. HOWEVER, NO ADDITIONAL COMPENSATION TO THE CONTRACTOR WILL BE ALLOWED FOR WHICH EVER OPTION CHOSEN.

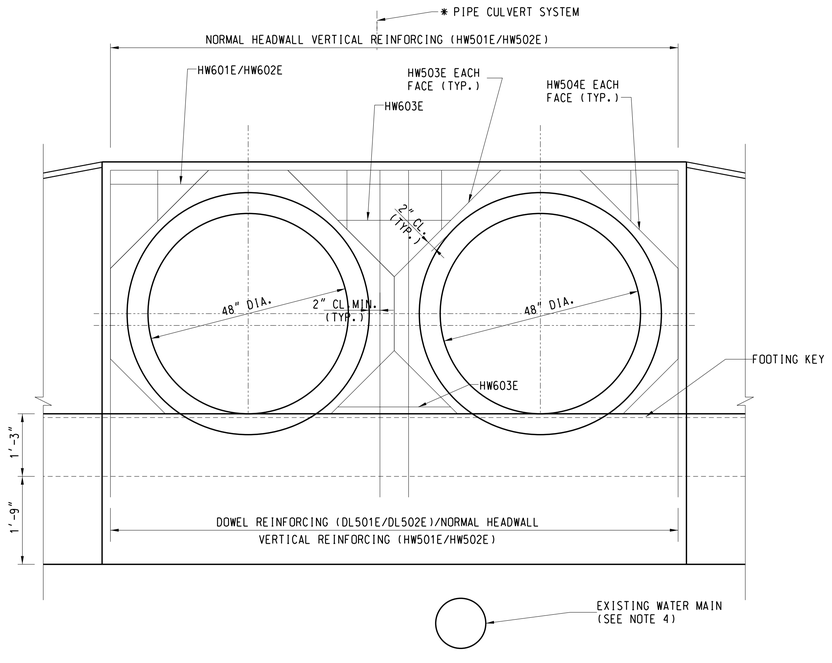
TYPICAL WING WALL SECTION

NOT TO SCALE



HEADWALL SECTION - ALONG CENTERLINE OF PIPE

NOT TO SCALE



REINFORCING AT PIPE OPENING

NOT TO SCALE

FOOTING REINFORCING IS NOT SHOWN FOR CLARITY.

MISS UTILITY of DELMARVA

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PREPARED BY:

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ENGINEER SEAL

JAMES J. KELLEY, REGISTERED, No. 12762, DELAWARE, PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DRAWN	DATE
0	-	-	-
1	-	-	-
2	-	-	-
3	-	-	-
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6	-	-	-

PREPARED FOR:

NEWARK DELAWARE
Committed to Service Excellence
220 SOUTH MAIN STREET
302-366-7000

APPROVALS		DATE
DRAWN BY:	DEN	8-14-20
CHECKED BY:	JJK	8-14-20
ENGINEER:	JJK	8-14-20
OPERATIONS:		
REVISION:		

CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: HEADWALL DETAILS

SCALE: NTS

SHEET NO: 9 OF 17

DWG NO. 9

(1) ANY MARK NUMBER WITH SUFFIX 'E' DENOTES EPOXY COATED REINFORCING STEEL.

(2) ALL MARK 'LOCATION PREFIXES' SHALL CONSIST OF TWO LETTERS AND ARE AS FOLLOWS: AB = ABUTMENT, AS = APPROACH SLAB, BC = BOX CULVERT, BW = BACKWALL, CL = COLUMN, DK = DECK, DL = DOWEL, FT = FOOTING, HW = HEADWALL, MS = MISC. BARS, PA = PARAPET, PR = PIER, SC = SHEETPILE CAP, SL = SLAB, TW = TOEWALL, WL = WALL (UNIQUE LOCATION), WW = WINGWALL

NORTH CULVERT HEADWALL

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES / QUARTER INCH)										
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F / R	G	H	J	K	O
4	5	5-0 0	HW501E	STR											
2	5	1-4 0		STR											
2	5	1-2 0		STR											
4	5	5-0 0	HW502E	STR											
2	5	1-4 0		STR											
2	5	1-2 0		STR											
4	5	6-5 2	HW503E	14		1-9 1	1-5 1	3-3 0							
4	5	6-4 1	HW504E	14		1-6 2	1-9 3	3-0 0							
2	6	12-8 0	HW601E	14		1-0 0	11-8 0	1-0 0							
2	6	11-8 0	HW602E	STR											
4	6	2-3 0	HW603E	STR											
4	6	6-10 0	HW604E	16			4-0 0	2-10 0							
4	5	5-4 0	DL501E	2		4-6 0	0-10 0								
4	5	5-4 0	DL502E	2		4-6 0	0-10 0								
13	4	7-6 0	FT401E	STR											
2	4	8-2 0		STR											
2	4	6-5 0		STR											
2	4	4-2 0		STR											
2	4	11-10 0	FT402E	STR											
2	4	12-8 0		STR											
2	4	13-5 0		STR											
2	4	14-2 0		STR											
2	4	15-0 0		STR											
2	4	15-9 0		STR											
2	4	16-6 0		STR											
2	4	17-4 0		STR											
2	4	18-1 0		STR											
1	4	11-10 0	FT403E	STR											
1	4	13-5 0		STR											
8	4	6-10 0	FT404E	16	3-4 0	2-4 0	1-0 0	3-4 3				2-4 0		2-4 0	3-4 0

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES / QUARTER INCH)										
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F / R	G	H	J	K	O
25	5	7-6 0	FT501E	STR											
2	5	7-8 0		STR											
2	5	8-2 0		STR											
2	5	7-7 0		STR											
2	5	6-5 0		STR											
2	5	5-4 0		STR											
2	5	4-2 0		STR											
3	6	11-4 0	FT601E	STR											

NORTH CULVERT WINGWALLS

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES / QUARTER INCH)										
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F / R	G	H	J	K	O
14	5	5-0 0	WW501E	STR											
14	5	5-0 0	WW502E	STR											
10	5	6-1 0	WW503E	STR											
12	5	4-8 0		STR											
2	6	6-1 0	WW601E	STR											
2	6	4-8 0		STR											
14	5	5-4 0	DL503E	2		4-6 0	0-10 0								
14	5	5-4 0	DL504E	2		4-6 0	0-10 0								
7	4	7-6 0	FT405E	STR											
2	4	7-9 0		STR											
2	4	5-4 0		STR											
4	4	8-9 1	FT406E	16			5-11 1	2-10 0							
4	4	9-2 0		16			6-4 0	2-10 0							
4	4	9-6 2		16			6-8 2	2-10 0							
4	4	10-11 1		16			7-1 1	2-10 0							
4	4	10-4 0		16			7-6 0	2-10 0							
4	4	10-8 2		16			7-10 2	2-10 0							
4	4	11-1 1		16			8-3 1	2-10 0							
4	4	11-5 3		16			8-7 3	2-10 0							
4	4	11-10 2		16			9-0 2	2-10 0							

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES / QUARTER INCH)										
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F / R	G	H	J	K	O
2	4	8-9 1	FT407E	16			5-11 1	2-10 0							
2	4	9-6 2		16			6-8 2	2-10 0							
10	4	6-10 0	FT408E	16	3-7 0	2-7 0	1-0 0	3-7 3				2-7 0		2-7 0	3-7 0
26	5	7-6 0	FT502E	STR											
2	5	8-0 0		STR											
2	5	7-9 0		STR											
2	5	6-7 0		STR											
2	5	5-4 0		STR											
2	5	4-2 0		STR											
2	6	8-9 1	FT602E	16			5-11 1	2-10 0							
2	6	8-11 3		16			6-1 3	2-10 0							
2	6	9-2 0		16			6-4 0	2-10 0							
4	4	6-0 0	MB501E	STR											
10	5	4-2 0	MB502E	8	0-10 0	2-6 0					0-10 0				

ASTM STANDARD ENGLISH REINFORCING BARS

BAR SIZE	NOMINAL DIMENSIONS: DIAMETER (INCHES)	AREA (INCHES²)	WEIGHT (LBS./FT.)
3	0.375	0.110	0.376
4	0.500	0.200	0.668
5	0.625	0.310	1.043
6	0.750	0.440	1.502
7	0.875	0.600	2.044
8	1.000	0.790	2.670
9	1.128	1.000	3.400
10	1.270	1.270	4.303
11	1.410	1.560	5.313
14	1.693	2.250	7.650
18	2.257	4.000	13.600

RECOMMENDED END HOOKS, APPLICABLE TO ALL GRADES

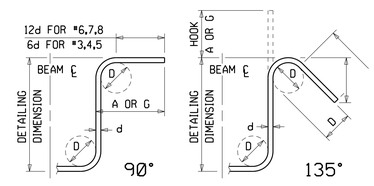
	180° HOOKS		90° HOOKS
	D	A OR G	J	A OR G
	2¼"	5"	3"	6"
	3"	6"	4"	8"
	3¾"	7"	5"	10"
	4½"	8"	6"	1-0"
	5¼"	10"	7"	1-2"
	6"	11"	8"	1-4"
	9½"	1-3"	11¾"	1-7"
	10¾"	1-5"	1-1¼"	1-10"
	1-0"	1-7"	1-2¾"	2-0"
	1-6¼"	2-3"	1-9¾"	2-7"
	2-0"	3-0"	2-4½"	3-5"

STIRRUP AND TIE HOOKS, APPLICABLE TO ALL GRADES

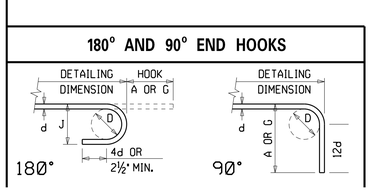
	90° HOOK	135° HOOK	
	D	A OR G	A OR G
	1½"	4"	4"	2½"
	2"	4½"	4½"	3"
	2½"	6"	5½"	3¾"
	4½"	1-0"	8"	4½"
	5¼"	1-2"	9"	5¼"
	6"	1-4"	10½"	6"

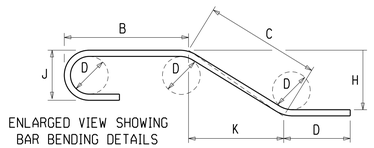
NOTES:
1. FIGURES SHOWN IN CIRCLES REPRESENT BAR BEND TYPES.
2. STANDARD BAR BENDS INCLUDE ONLY THOSE TYPES BELOW, INDICATED AS SUCH.
3. ALL DIMENSIONS OUT-TO-OUT, EXCEPT "A" AND "G" ON STD. 180° AND 135° HOOKS.
4. "J" DIMENSIONS ON 180° HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE, OTHERWISE STANDARD 'ACI' HOOKS ARE TO BE USED.
5. WHERE "J" IS NOT SHOWN, "J" WILL BE KEPT EQUAL TO OR LESS THAN "H" ON TYPES 3, 5 AND 22. WHERE "J" CAN EXCEED "H", IT SHALL BE SHOWN.
6. "H" DIMENSIONS OF STIRRUPS TO BE SHOWN AS NEEDED TO FIT WITHIN THE CONCRETE.
7. UNLESS OTHERWISE NOTED, DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR (EXCEPT FOR BEND TYPES 11 AND 13).
8. WHERE SLOPE DIFFERS FROM 45° OFFSET, "H" AND "K" MUST BE SHOWN.
9. WHERE BARS ARE TO BE BENT MORE ACCURATELY THAN STANDARD BENDING TOLERANCES, BENDING DIMENSIONS REQUIRING CLOSER FABRICATION SHOULD HAVE LIMITS INDICATED.
10. FOR RECOMMENDED DIAMETER "D", OF BENDS, HOOKS, ETC., REFER TO TABLE ABOVE, 'CRSI' OR 'ACI' TABLES WHERE APPLICABLE AND REQUIRED.
11. TYPE S1-S6, S11, T1-T3 AND T6-T9 APPLICABLE TO BAR SIZESL #3 THROUGH #8.

STIRRUP AND TIE HOOKS

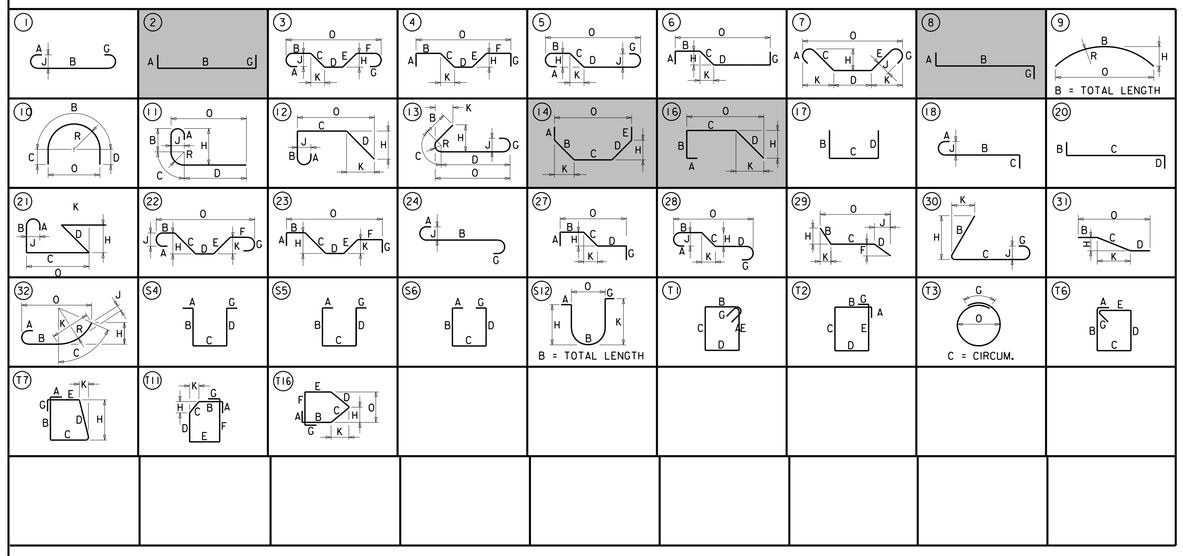


180° AND 90° END HOOKS





STANDARD BAR BENDS



BEFORE YOU DIG CALL 1-800-282-8555 (In Del.) 1-800-441-8355 (Md., Va.) PROTECT YOURSELF, GIVE TWO WORKING DAYS NOTICE

MISS UTILITY of DELMARVA

PREPARED BY:

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
121 Continental Drive, Suite 300 Newark, DE 19713

ENGINEER SEAL

JAMES J. KELLEY, REGISTERED No. 12162 PROFESSIONAL ENGINEER, DELAWARE

REV.	DESCRIPTION	DRAWN	DATE
0	–	–	–
1	–	–	–
2	–	–	–
3	–	–	–
4	–	–	–
5	–	–	–
6	–	–	–

PREPARED FOR:

NEWARK DELAWARE
Committed to Service Excellence
220 SOUTH MAIN STREET
302-366-7000

APPROVALS		DATE
DRAWN BY:	DEN	8-14-20
CHECKED BY:	JJK	8-14-20
ENGINEER:	JJK	8-14-20
OPERATIONS:		
REVISION:		

CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: HEADWALL DETAILS
SCALE: NTS
SHEET NO: 10 OF 17
DWG NO. 10

(1) ANY MARK NUMBER WITH SUFFIX 'E' DENOTES EPOXY COATED REINFORCING STEEL.

(2) ALL MARK 'LOCATION PREFIXES' SHALL CONSIST OF TWO LETTERS AND ARE AS FOLLOWS: AB = ABUTMENT, AS = APPROACH SLAB, BC = BOX CULVERT, BW = BACKWALL, CL = COLUMN, DK = DECK, DL = DOWEL, FT = FOOTING, HW = HEADWALL, MS = MISC. BARS, PA = PARAPET, PR = PIER, SC = SHEETPILE CAP, SL = SLAB, TW = TOEWALL, WL = WALL (UNIQUE LOCATION), WW = WINGWALL

SOUTH CULVERT HEADWALL

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES / QUARTER INCH)									
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F / R	G	H	J	K	O
4	5	4-10 0	HW501E	STR											
2	5	1-2 0		STR											
2	5	1-0 0		STR											
4	5	4-10 0	HW502E	STR											
2	5	1-2 0		STR											
2	5	1-0 0		STR											
4	5	6-2 2	HW503E	14		1-9 1	1-5 1	3-0 0							
4	5	6-1 2	HW504E	14		1-6 2	1-9 3	2-9 1							
2	6	12-8 0	HW601E	14		1-0 0	11-8 0	1-0 0							
2	6	11-8 0	HW602E	STR											
4	6	2-3 0	HW603E	STR											
4	6	6-10 0	HW604E	16			4-0 0	2-10 0							
4	5	5-4 0	DL501E	2		4-6 0	0-10 0								
4	5	5-4 0	DL502E	2		4-6 0	0-10 0								
13	4	7-6 0	FT401E	STR											
2	4	8-2 0		STR											
2	4	6-5 0		STR											
2	4	4-2 0		STR											
2	4	11-10 0	FT402E	STR											
2	4	12-8 0		STR											
2	4	13-5 0		STR											
2	4	14-2 0		STR											
2	4	15-0 0		STR											
2	4	15-9 0		STR											
2	4	16-6 0		STR											
2	4	17-4 0		STR											
2	4	18-1 0		STR											
1	4	11-10 0	FT403E	STR											
1	4	13-5 0		STR											
8	4	6-10 0	FT404E	16	3-4 0	2-4 0	1-0 0	3-4 3				2-4 0		2-4 0	3-4 0

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES / QUARTER INCH)									
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F / R	G	H	J	K	O
25	5	7-6 0	FT501E	STR											
2	5	7-8 0		STR											
2	5	8-2 0		STR											
2	5	7-7 0		STR											
2	5	6-5 0		STR											
2	5	5-4 0		STR											
2	5	4-2 0		STR											
3	6	11-4 0	FT601E	STR											

SOUTH CULVERT WINGWALLS

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES / QUARTER INCH)									
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F / R	G	H	J	K	O
11	5	4-10 0	WW501E	STR											
11	5	4-10 0	WW502E	STR											
8	5	6-1 0	WW503E	STR											
10	5	4-8 0		STR											
4	5	2-10 0		STR											
2	5	2-6 0		STR											
4	5	5-3 0	WW504E	14		2-6 0	1-2 0	1-7 0							
2	6	6-1 0	WW601E	STR											
2	6	4-8 0		STR											
11	5	5-4 0	DL503E	2		4-6 0	0-10 0								
2	5	4-7 0		2		3-9 0	0-10 0								
1	5	4-3 0		2		3-5 0	0-10 0								
13	5	5-4 0	DL504E	2		4-6 0	0-10 0								
1	5	5-0 0		2		4-2 0	0-10 0								

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES / QUARTER INCH)									
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F / R	G	H	J	K	O
7	4	7-6 0	FT405E	STR											
2	4	7-9 0		STR											
2	4	5-4 0		STR											
4	4	8-9 1	FT406E	16			5-11 1	2-10 0							
4	4	9-2 0		16			6-4 0	2-10 0							
4	4	9-6 2		16			6-8 2	2-10 0							
4	4	10-11 1		16			7-1 1	2-10 0							
4	4	10-4 0		16			7-6 0	2-10 0							
4	4	10-8 2		16			7-10 2	2-10 0							
4	4	11-1 1		16			8-3 1	2-10 0							
4	4	11-5 3		16			8-7 3	2-10 0							
4	4	11-10 2		16			9-0 2	2-10 0							
2	4	8-9 1	FT407E	16			5-11 1	2-10 0							
2	4	9-6 2		16			6-8 2	2-10 0							
10	4	6-10 0	FT408E	16	3-7 0	2-7 0	1-0 0	3-7 3				2-7 0		2-7 0	3-7 0
26	5	7-6 0	FT502E	STR											
2	5	8-0 0		STR											
2	5	7-9 0		STR											
2	5	6-7 0		STR											
2	5	5-4 0		STR											
2	5	4-2 0		STR											
2	6	8-9 1	FT602E	16			5-11 1	2-10 0							
2	6	8-11 3		16			6-1 3	2-10 0							
2	6	9-2 0		16			6-4 0	2-10 0							
2	4	6-0 0	MB501E	STR											
2	4	2-6 0		STR											
8	5	4-2 0	MB502E	8	0-10 0	2-6 0						0-10 0			

ASTM STANDARD ENGLISH REINFORCING BARS

BAR SIZE	NOMINAL DIMENSIONS: DIAMETER (INCHES)	NOMINAL DIMENSIONS: AREA (INCHES²)	NOMINAL DIMENSIONS: WEIGHT (LBS./FT.)
3	0.375	0.110	0.376
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5	0.625	0.310	1.043
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14	1.693	2.250	7.650
18	2.257	4.000	13.600

RECOMMENDED END HOOKS, APPLICABLE TO ALL GRADES

	180° HOOKS		90° HOOKS
D	A OR G	J	A OR G
2¼"	5"	3"	6"
3"	6"	4"	8"
3¾"	7"	5"	10"
4½"	8"	6"	1-0"
5¼"	10"	7"	1-2"
6"	11"	8"	1-4"
9½"	1-3"	11¾"	1-7"
10¾"	1-5"	1-1¼"	1-10"
1-0"	1-7"	1-2¾"	2-0"
1-6¼"	2-3"	1-9¾"	2-7"
2-0"	3-0"	2-4½"	3-5"

STIRRUP AND TIE HOOKS, APPLICABLE TO ALL GRADES

	90° HOOK	135° HOOK	
D	A OR G	A OR G	A OR G
1½"	4"	4"	2½"
2"	4½"	4½"	3"
2½"	6"	5½"	3¾"
4½"	1-0"	8"	4½"
5¼"	1-2"	9"	5¼"
6"	1-4"	10½"	6"

NOTES:
1. FIGURES SHOWN IN CIRCLES REPRESENT BAR BEND TYPES.
2. STANDARD BAR BENDS INCLUDE ONLY THOSE TYPES BELOW, INDICATED AS SUCH.
3. ALL DIMENSIONS OUT-TO-OUT, EXCEPT "A" AND "G" ON STD. 180° AND 135° HOOKS.
4. "J" DIMENSIONS ON 180° HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE, OTHERWISE STANDARD 'ACI' HOOKS ARE TO BE USED.
5. WHERE "J" IS NOT SHOWN, "J" WILL BE KEPT EQUAL TO OR LESS THAN "H" ON TYPES 3, 5 AND 22. WHERE "J" CAN EXCEED "H", IT SHALL BE SHOWN.
6. "H" DIMENSIONS OF STIRRUPS TO BE SHOWN AS NEEDED TO FIT WITHIN THE CONCRETE.
7. UNLESS OTHERWISE NOTED, DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR (EXCEPT FOR BEND TYPES 11 AND 13).
8. WHERE SLOPE DIFFERS FROM 45° OFFSET, "H" AND "K" MUST BE SHOWN.
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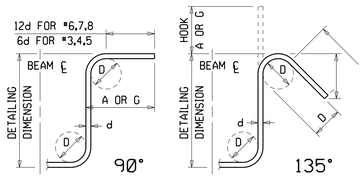
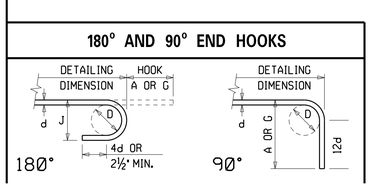
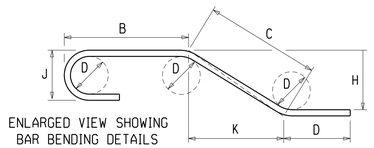
11. TYPE S1-S6, S11, T1-T3 AND T6-T9 APPLICABLE TO BAR SIZESL #3 THROUGH #8.

STIRRUP AND TIE HOOKS

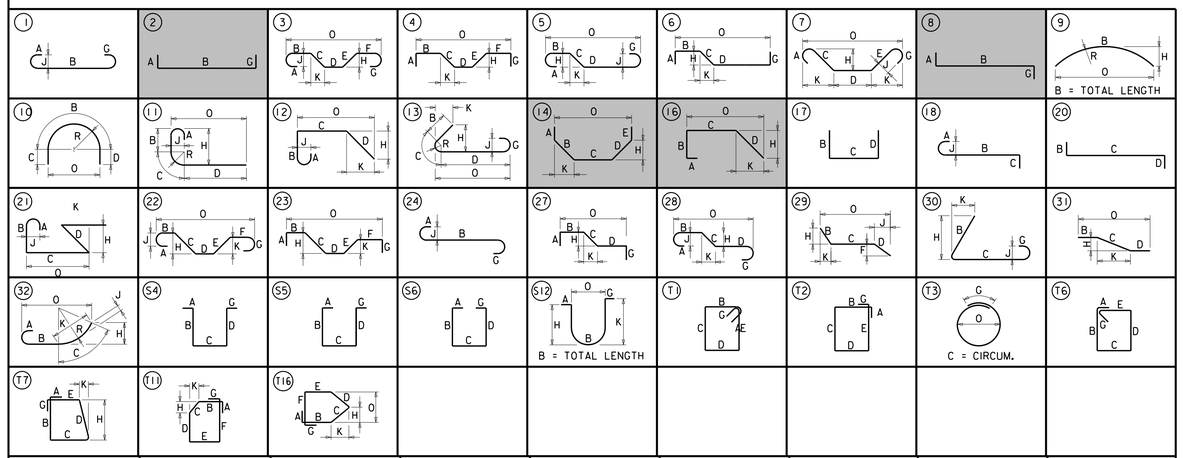


180° AND 90° END HOOKS





STANDARD BAR BENDS



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PREPARED BY:

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
121 Continental Drive, Suite 300 Newark, DE 19713

ENGINEER SEAL

JAMES J. KELLEY, REGISTERED, No. 12162, DELAWARE, PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DRAWN	DATE
0	–	–	–
1	–	–	–
2	–	–	–
3	–	–	–
4	–	–	–
5	–	–	–
6	–	–	–

PREPARED FOR:

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Committed to Service Excellence
220 SOUTH MAIN STREET
302-366-7000

APPROVALS		DATE
DRAWN BY:	DEN	8-14-20
CHECKED BY:	JJK	8-14-20
ENGINEER:	JJK	8-14-20
OPERATIONS:		
REVISION:		

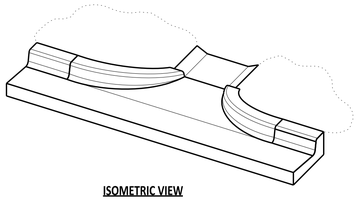
CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: HEADWALL DETAILS

SCALE: NTS

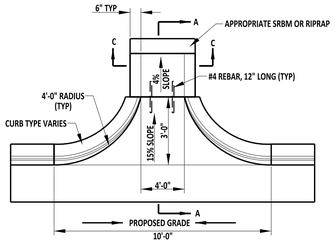
SHEET NO: 11 OF 17

DWG NO. 11



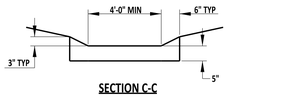
ISOMETRIC VIEW

SHOWN WITH INTEGRAL CURB & GUTTER, TYPE 1-8

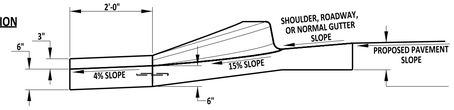


PLAN VIEW

IN SUMP LOCATION

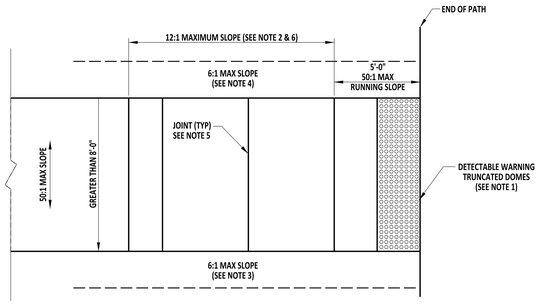


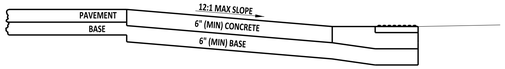
SECTION C-C



SECTION A-A

CURB OPENING DETAIL
NOT TO SCALE

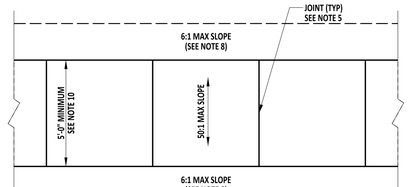


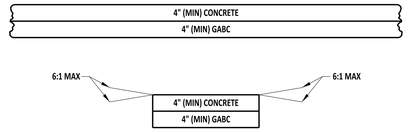


SHARED-USE PATH

NOTES:

1). IF THE SHARED-USE PATH ENDS AT A ROADWAY OR RAILROAD CROSSING, THEN DETECTABLE WARNING TRUNCATED DOMES 24" LONG AND THE FULL WIDTH OF THE PATH SHALL BE INSTALLED. SEE DETAIL C-2.
2). FOR ALTERATIONS WHERE THE MAXIMUM ALLOWABLE 12:1 RUNNING SLOPE WILL NOT MEET THE EXISTING SIDEWALK OR SHARED USE PATH GRADE WITHIN A LENGTH OF 15'-0", THE SLOPED SEGMENT OF THE PEDESTRIAN CONNECTION MAY BE LIMITED TO 15'-0" AT A CONSTANT SLOPE, AND ALLOWED TO EXCEED THE 12:1 MAXIMUM SLOPE.
3). A 6:1 MAX SLOPE IS REQUIRED FOR 2'-0" ON BOTH SIDES OF THE SHARED-USE PATH.
4). TOPSOIL, SEED, & MULCH ANY DISTURBED AREA ADJACENT TO THE SHARED-USE PATH UP TO A MAXIMUM OF 2'-0".
5). FOR SIDEWALKS AND CONCRETE SHARED-USE PATHS, CONSTRUCTION JOINTS SHALL BE PLACED EVERY 10'-0" AND EXPANSION MATERIAL EVERY 20'-0". HOWEVER, EXPANSION MATERIAL SHALL NOT BE USED IN THE SLOPED SECTION.
6). IF THE RUNNING SLOPE IS LESS THAN 20:1 (5%) THEN THE 50:1 (2%) LANDING CAN BE OMITTED. DETECTABLE WARNING SYSTEM MUST STILL BE PLACED.

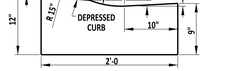




SIDEWALK

7). SEE DETAIL C-2, SHEETS 1, 2 OR 3 FOR PEDESTRIAN CONNECTION TREATMENTS WHEN THE SIDEWALK OR SHARED-USE PATH INTERSECTS WITH A TRAVELWAY.
8). A 6:1 MAX SLOPE IS REQUIRED FOR 2'-0" ON BOTH SIDES OF THE SIDEWALK.
9). TOPSOIL, SEED, & MULCH ANY DISTURBED AREA ADJACENT TO THE SIDEWALK UP TO A MAXIMUM OF 2'-0".
10). ON REHABILITATION PROJECTS, WHEN EXISTING OBSTRUCTIONS (FIRE HYDRANT, UTILITY POLE, ETC...) ARE LOCATED IN THE SIDEWALK, THE SIDEWALK PATH SHALL NOT BE LESS THAN 34" WIDE FOR NO MORE THEN 24".

SHARED-USE PATH & SIDEWALK DETAILS
NOT TO SCALE

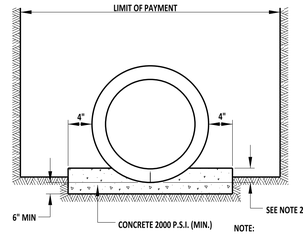


INTEGRAL P.C.C. CURB AND GUTTER
TYPE 2

NOTES:

1). WHEN P.C.C. CURB OR INTEGRAL P.C.C. CURB AND GUTTER IS PLACED ADJACENT TO PORTLAND CEMENT CONCRETE PAVEMENT, CONSTRUCT THE JOINT AS PER THE LONGITUDINAL JOINT SEALANT DETAIL ON DETAIL P-2, SHEET 3 OF 5. USE APPROVED JOINT FILLER TO SEAL. WORK TO BE PAID UNDER RESPECTIVE CURB AND GUTTER ITEM.
2). THE DEPRESSED CURB DIMENSIONS (INCLUDING 1" LIP) ARE FOR USE AT ENTRANCES ONLY.
3). 4" OF GABC, TYPE B SHALL BE PLACED UNDER ALL P.C.C. CURB AND P.C.C. CURB AND GUTTER.
4). DEPRESS END OF CURB RUNS NOT PART OF AN ISLAND OR MEDIAN FLUSH WITH PAVEMENT OR ADJACENT AREA AT A SLOPE OF 12:1.

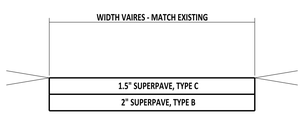
INTEGRAL P.C.C. CURB & GUTTER
NOT TO SCALE



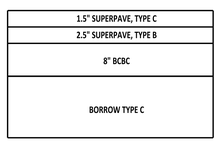
NOTE:

1). FOR CLASS A BEDDING, IMBED PIPE IN CONCRETE 6" FOR PIPES SMALLER THAN 24" I.D., 10" FOR PIPES 24" TO 60", AND FOR PIPES LARGER THAN 60" SEE PROJECT DETAILS.

CLASS A PIPE BEDDING
NOT TO SCALE



TYPICAL MILL AND OVERLAY RESTORATION DETAIL
NOT TO SCALE



PERMANENT CROSS-ROAD PATH
NOT TO SCALE

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JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
121 Continental Drive, Suite 300 Newark, DE 19713

ENGINEER SEAL

JAMES J. KELLEY REGISTERED No. 12162 DELAWARE PROFESSIONAL ENGINEER

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220 SOUTH MAIN STREET
302-366-7000

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DRAWN BY:	DEN	8-14-20
CHECKED BY:	JJK	8-14-20
ENGINEER:	JJK	8-14-20
OPERATIONS:		
REVISION:		

CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: CONSTRUCTION DETAILS

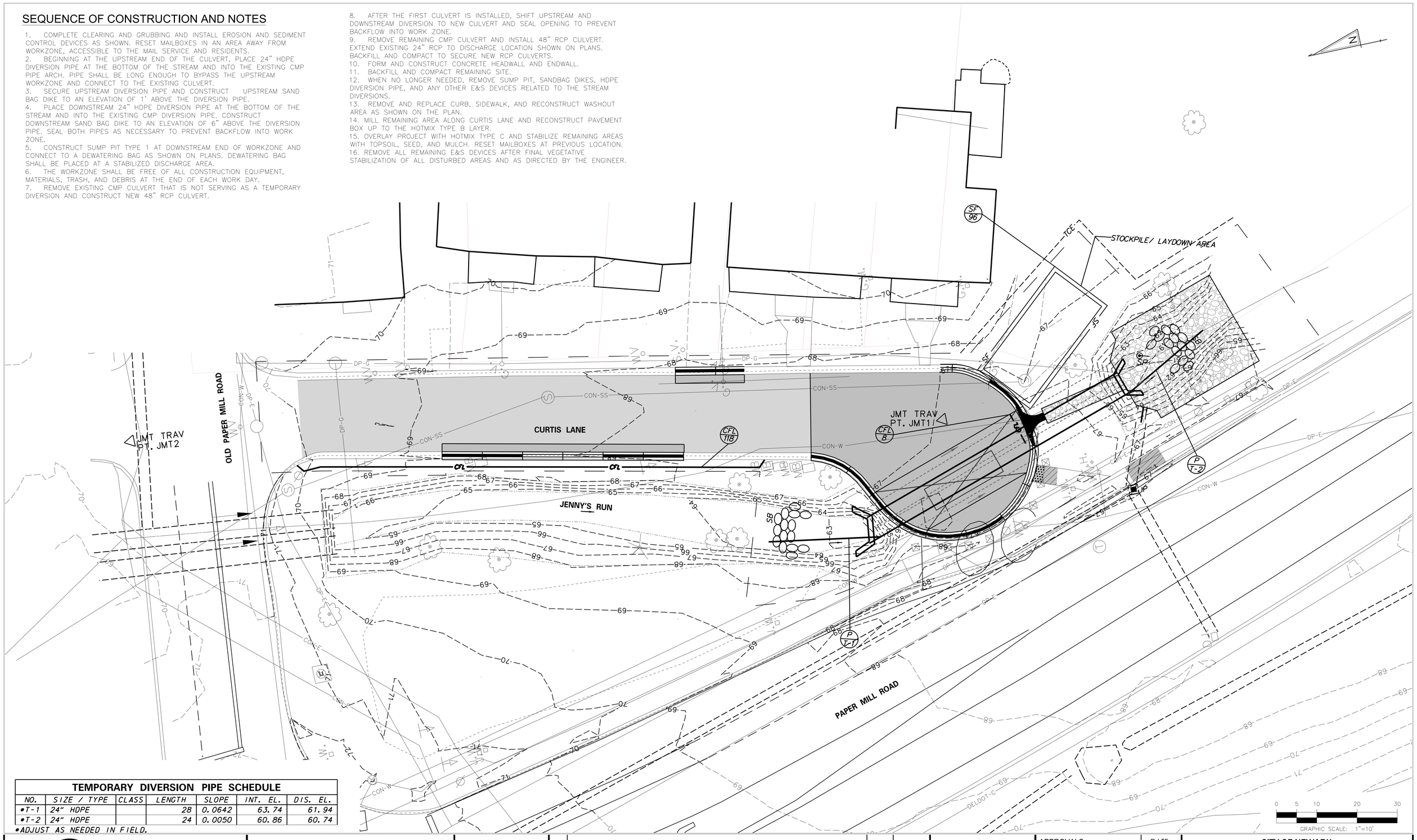
SCALE: NTS

DWG NO. 12

SHEET NO: 12 OF 17

SEQUENCE OF CONSTRUCTION AND NOTES

1. COMPLETE CLEARING AND GRUBBING AND INSTALL EROSION AND SEDIMENT CONTROL DEVICES AS SHOWN. RESET MAILBOXES IN AN AREA AWAY FROM WORKZONE, ACCESSIBLE TO THE MAIL SERVICE AND RESIDENTS.
2. BEGINNING AT THE UPSTREAM END OF THE CULVERT, PLACE 24" HDPE DIVERSION PIPE AT THE BOTTOM OF THE STREAM AND INTO THE EXISTING CMP PIPE ARCH. PIPE SHALL BE LONG ENOUGH TO BYPASS THE UPSTREAM WORKZONE AND CONNECT TO THE EXISTING CULVERT.
3. SECURE UPSTREAM DIVERSION PIPE AND CONSTRUCT UPSTREAM SAND BAG DIKE TO AN ELEVATION OF 1' ABOVE THE DIVERSION PIPE.
4. PLACE DOWNSTREAM 24" HDPE DIVERSION PIPE AT THE BOTTOM OF THE STREAM AND INTO THE EXISTING CMP DIVERSION PIPE. CONSTRUCT DOWNSTREAM SAND BAG DIKE TO AN ELEVATION OF 6" ABOVE THE DIVERSION PIPE. SEAL BOTH PIPES AS NECESSARY TO PREVENT BACKFLOW INTO WORK ZONE.
5. CONSTRUCT SUMP PIT TYPE 1 AT DOWNSTREAM END OF WORKZONE AND CONNECT TO A DEWATERING BAG AS SHOWN ON PLANS. DEWATERING BAG SHALL BE PLACED AT A STABILIZED DISCHARGE AREA.
6. THE WORKZONE SHALL BE FREE OF ALL CONSTRUCTION EQUIPMENT, MATERIALS, TRASH, AND DEBRIS AT THE END OF EACH WORK DAY.
7. REMOVE EXISTING CMP CULVERT THAT IS NOT SERVING AS A TEMPORARY DIVERSION AND CONSTRUCT NEW 48" RCP CULVERT.
8. AFTER THE FIRST CULVERT IS INSTALLED, SHIFT UPSTREAM AND DOWNSTREAM DIVERSION TO NEW CULVERT AND SEAL OPENING TO PREVENT BACKFLOW INTO WORK ZONE.
9. REMOVE REMAINING CMP CULVERT AND INSTALL 48" RCP CULVERT. EXTEND EXISTING 24" RCP TO DISCHARGE LOCATION SHOWN ON PLANS. BACKFILL AND COMPACT TO SECURE NEW RCP CULVERTS.
10. FORM AND CONSTRUCT CONCRETE HEADWALL AND ENDWALL.
11. BACKFILL AND COMPACT REMAINING SITE.
12. WHEN NO LONGER NEEDED, REMOVE SUMP PIT, SANDBAG DIKES, HDPE DIVERSION PIPE, AND ANY OTHER E&S DEVICES RELATED TO THE STREAM DIVERSIONS.
13. REMOVE AND REPLACE CURB, SIDEWALK, AND RECONSTRUCT WASHOUT AREA AS SHOWN ON THE PLAN.
14. MILL REMAINING AREA ALONG CURTIS LANE AND RECONSTRUCT PAVEMENT BOX UP TO THE HOTMIX TYPE B LAYER.
15. OVERLAY PROJECT WITH HOTMIX TYPE C AND STABILIZE REMAINING AREAS WITH TOPSOIL, SEED, AND MULCH. RESET MAILBOXES AT PREVIOUS LOCATION.
16. REMOVE ALL REMAINING E&S DEVICES AFTER FINAL VEGETATIVE STABILIZATION OF ALL DISTURBED AREAS AND AS DIRECTED BY THE ENGINEER.



TEMPORARY DIVERSION PIPE SCHEDULE

NO.	SIZE / TYPE	CLASS	LENGTH	SLOPE	INT. EL.	DIS. EL.
*T-1	24" HDPE		28	0.0642	63.74	61.94
*T-2	24" HDPE		24	0.0050	60.86	60.74

*ADJUST AS NEEDED IN FIELD.

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ENGINEER:	JJK	8-14-20
OPERATIONS:		
REVISION:		

CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

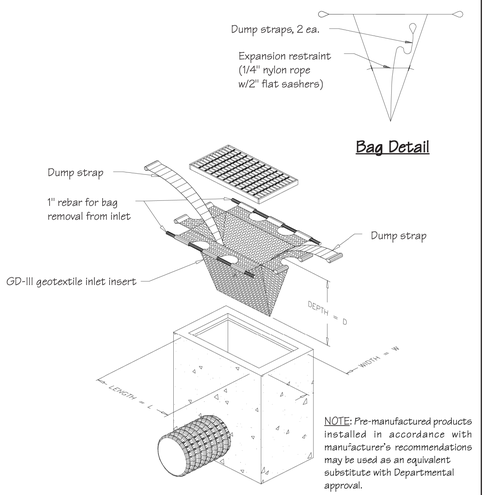
SHEET TITLE: EROSION & SEDIMENT CONTROL PLAN

SCALE: 1"=10'

DWG NO. 13

SHEET NO: 13 OF 17

Standard Detail & Specifications
Inlet Protection - Type 2



Source:	Symbol:	Detail No.
Adapted from ACF Products, Inc.	IP-2	**DE-ESC-3.1.5.2** Sheet 1 of 2 Effective FEB 2019

Standard Detail & Specifications
Inlet Protection - Type 2

Notes:

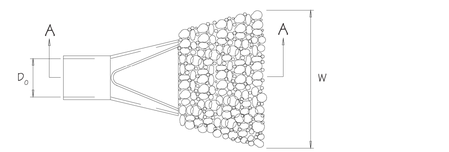
1. This practice shall only be used in situations in which Inlet Protection - Type 1 cannot be used due to site constraints. These include, but are not limited to partially completed parking areas, streets, roads, etc.
2. It may be necessary to transition from Type 1 to Type 2 Inlet Protection as construction proceeds.
3. For areas where there is a concern for oil run-off or spills, insert shall meet one of the above specifications with an oil-absorbant pillow or shall be made completely from an oil-absorbant material with a woven pillow.

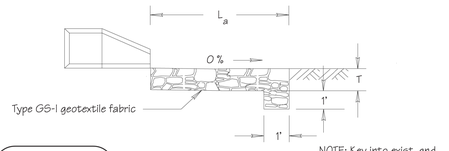
Materials:

The geotextile inlet insert shall meet or exceed the specifications of Type GD-III geotextile in accordance with Appendix A-3 of the Delaware Erosion & Sediment Control Handbook.

Source:	Symbol:	Detail No.
Adapted from ACF Products, Inc.	IP-2	**DE-ESC-3.1.5.2** Sheet 2 of 2 Effective FEB 2019

Standard Detail & Specifications
Riprap Outlet Protection - 1





DATA
Pipe diameter (D_o)
Apron length (L_a)
Apron width (W)
Riprap size (R No.)
Riprap thickness (T)

$T_w < 0.5\ D_o$

Source:	Symbol:	Detail No.
Adapted from MD Stds. & Specs. for ESC	ROP-1	**DE-ESC-3.3.10.1** Sheet 1 of 2 Effective FEB 2019

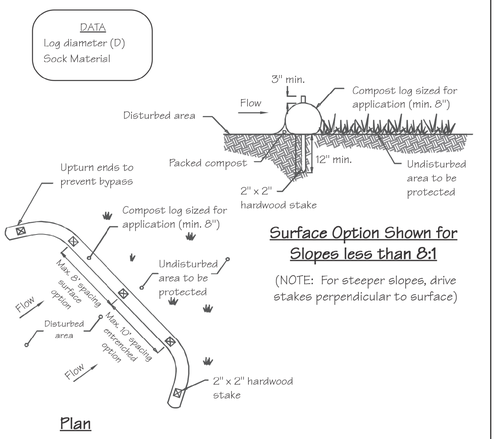
Standard Detail & Specifications
Riprap Outlet Protection - 1

Construction Notes:

1. The subgrade for the riprap shall be prepared to the required lines and grades as shown on the plan. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.
2. The riprap shall conform to the grading limits as shown on the plan.
3. Filter cloth shall be protected from punching, cutting or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of cloth over the damaged area. All connecting joints should overlap a minimum of 1 ft. If the damage is extensive, replace the entire filter cloth.
4. Stone for the riprap or gabion outlets may be placed by equipment. Riprap shall be placed in a manner to prevent damage to the filter cloth. Hand placement will be required to the extent necessary to prevent damage to the conduits, structures, etc.

Source:	Symbol:	Detail No.
Adapted from MD Stds. & Specs. for ESC	ROP-1	**DE-ESC-3.3.10.1** Sheet 2 of 2 Effective FEB 2019

Standard Detail & Specifications
Compost Filter Log



NOTE: Manufacturer's recommendations supersede any installation details shown for this practice

Source:	Symbol:	Detail No.
Adapted from MD Stds & Specs for ESC & Filtrexx™ International	CFL	**DE-ESC-3.1.7** Sheet 1 of 2 Effective FEB 2019

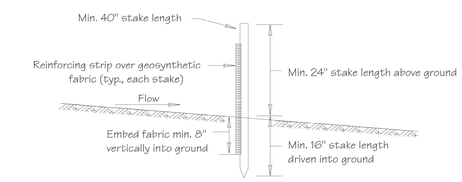
Standard Detail & Specifications
Compost Filter Log

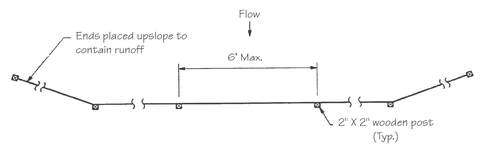
Construction Notes:

1. Prior to installation, clear bedding area of obstructions including rocks or debris larger than 1 inch and fill in any sharp depression areas.
2. If socks are prepared on-site, fill the sock fabric using a pneumatic blower so that the logs are rigid and do not deform. Terminate at the desired length.
3. For trenched applications, excavate 2 to 4 inches below grade along the width and length of the compost filter log.
4. Install the compost filter logs perpendicular to the flow direction and parallel to the slope with the beginning and end of the installation pointing up the slope a minimum of 1 foot elevation difference. On sites where this is not possible, upturn at a minimum length of 10' at a 30 degree angle to prevent runoff bypass.
5. For untrenched applications, blow or hand pack soil, mulch, or compost on the upslope side of the log, filling the bottom void area.
6. Stake the filled log every 10 feet maximum through the center of the sock for trenched applications, or every 8 feet for untrenched. The stake shall be a 2" by 2" hardwood. It should extend 12" below grade and protrude at least 3" above the top of the sock. If located on a slope greater than 8:1, the stake shall be angled downslope at a 45 degree angle to prevent the force of the water from dislodging to log.
7. When the length of the compost filter log needed exceeds the available compost filter sock length, the next sock shall be overlapped a minimum of 12" before being filled, and a stake placed through both socks at the overlap.
8. Remove accumulated sediment when it has reached half of the effective height of the log.
9. Inspect weekly and after rain event. If sock is degrading or the sock is failing, vegetate to secure the compost, replace the log, or reinforce with an additional log. If the log has been crushed due to construction equipment, it can be "fluffed" back to its effective height. If the effective height can no longer be restored, the log shall be replaced or reinforced with an additional compost filter log.

Source:	Symbol:	Detail No.
Adapted from MD Stds & Specs for ESC & Filtrexx™ International	CFL	**DE-ESC-3.1.7** Sheet 2 of 2 Effective FEB 2019

Standard Detail & Specifications
Silt Fence

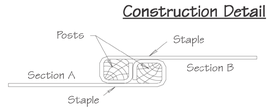




DATA
Max. controlled slope

Source:	Symbol:	Detail No.
Adapted form MD Stds. & Specs. for ESC	SF	**DE-ESC-3.1.2.1** Sheet 1 of 2 Effective FEB 2019

Standard Detail & Specifications
Silt Fence



Method for joining continuous sections

Construction Notes:

1. Geosynthetic fabric to be fastened securely to fence posts with wire ties or staples.
2. When two sections of filter cloth adjoin each other they shall be overlapped by six inches and folded.
3. Maintenance shall be performed as needed and material removed when "bulges" develop in the silt fence.

Materials:

1. Stakes: Steel (either T or U) or 2" x 2" hardwood
2. Geosynthetic Fabric: Type GD-I
3. Reinforcing strip: Wooden lath or plastic strip

Source:	Symbol:	Detail No.
Adapted from MD Stds. & Specs. for ESC	SF	**DE-ESC-3.1.2.1** Sheet 2 of 2 Effective FEB 2019

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REVISION:		

CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: EROSION & SEDIMENT CONTROL DETAILS

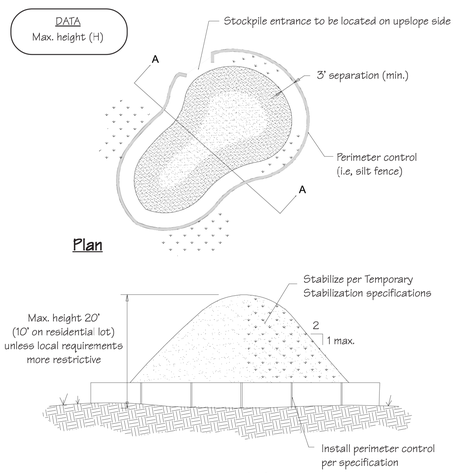
SCALE: NTS

SHEET NO: 14 OF 17

DWG NO. 14

Standard Detail & Specifications

Soil Stockpile



Source:	Symbol:	Detail No.
Adapted from Colorado Urban Storm Drainage Criteria Manual, Vol 3	SP	DE-ESC-3.7.3 Sheet 1 of 2 Effective FEB 2019

Standard Detail & Specifications

Soil Stockpile

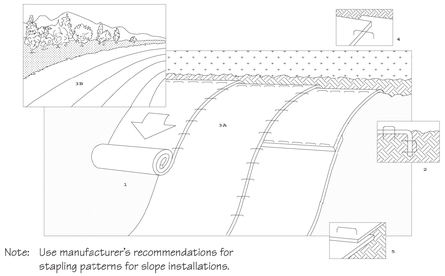
Construction Notes:

1. Locate stockpiles so that they are 50 feet from any storm drain inlet, open channel, wetland or waterbody. Redirect any concentrated flow around the stockpile using an approved erosion and sediment control measure.
2. Secure the perimeter of the stockpile with an approved erosion and sediment control perimeter device.
3. If stockpile is to remain inactive for more than 14 calendar days, the stockpile must be vegetated. Follow the temporary vegetation specifications. The vegetation chosen shall last the duration of the stockpile; the stockpile shall be restabilized if the temporary vegetation dies or erosion results.

Source:	Symbol:	Detail No.
Adapted from Colorado Urban Storm Drainage Criteria Manual, Vol 3	SP	DE-ESC-3.7.3 Sheet 2 of 2 Effective FEB 2019

Standard Detail & Specifications

Stabilization Matting - Slope



Note: Use manufacturer's recommendations for stapling patterns for slope installations.

Perepective

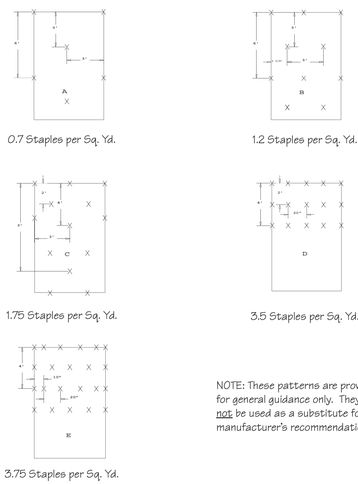
Construction Notes:

1. Prepare soil before installing matting, including application of lime, fertilizer, and seed.
2. Begin at the top of the slope by anchoring the mat in a 6" deep X 6" wide trench. Backfill and compact trench after stapling.
3. Roll the mats (A) down or (B) horizontally across the slope.
4. The edges of parrallel mats must be stapled with approx. 2" overlap.
5. When mats must be spliced down the slope, place mats end over end (shingle style) with approx. 4" overlap. Staple through overlapped area, approx. 12" apart.

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-S	DE-ESC-3.4.6.1 Sheet 1 of 2 Effective FEB 2019

Standard Detail & Specifications

Stabilization Matting - Slope



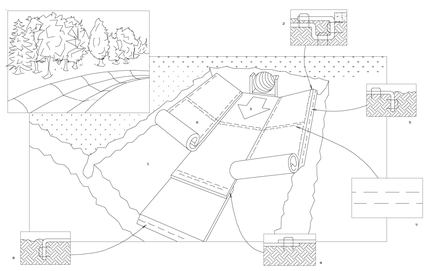
NOTE: These patterns are provided for general guidance only. They shall not be used as a substitute for manufacturer's recommendations.

Stapling Patterns

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-S	DE-ESC-3.4.6.1 Sheet 2 of 2 Effective FEB 2019

Standard Detail & Specifications

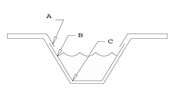
Stabilization Matting - Channel



Perspective

CRITICAL POINTS

A. Overlaps and seams
B. Projected waterline
C. Channel bottom/side slope vertices



Note: Horizontal staple spacing should be altered if necessary to allow staples to secure the critical points along the channel surface.

Use manufacturer's recommendations for stapling patterns for channel installations.

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-C	DE-ESC-3.4.6.2 Sheet 1 of 3 Effective FEB 2019

Standard Detail & Specifications

Stabilization Matting - Channel

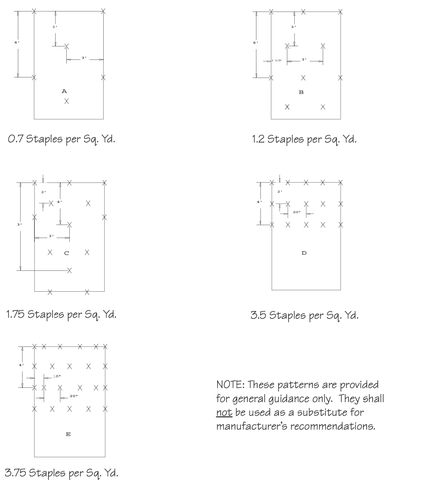
Construction Notes:

1. Prepare soil before installing matting, including application of lime, fertilizer, and seed.
2. Begin at the top of the channel by anchoring the mat in a 6" deep X 6" wide trench. Backfill and compact the trench after stapling.
3. Roll center mat in direction of water flow on bottom of channel.
4. Place mats end over end (shingle style) with a 6" overlap, use a double row of staggered staples 4" apart to secure mats.
5. Full Length edge of mats at top of side slopes must be anchored in 6" deep X 6" wide trench; backfill and compact the trench after stapling.
6. Mats on side slopes must be overlapped 4" over the center mat and stapled.
7. In high flow channel applications, a staple check slot is recommended at 30 to 40 foot intervals. Use a row of staples 4" apart over entire width of the channel. Place a second row 4" below the first row in a staggered pattern.
8. The terminal end of the mats must be anchored in a 6" X 6" wide trench. Backfill and compact the trench after stapling.

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-C	DE-ESC-3.4.6.2 Sheet 2 of 3 Effective FEB 2019

Standard Detail & Specifications

Stabilization Matting - Channel



NOTE: These patterns are provided for general guidance only. They shall not be used as a substitute for manufacturer's recommendations.

Stapling Patterns

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-C	DE-ESC-3.4.6.2 Sheet 3 of 3 Effective FEB 2019

Standard Detail & Specifications

Topsoiling

Construction Notes:

1. **Site Preparation** (Where Topsoil is to be added)

   Note: When topsoiling, maintain needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, waterways and sediment basins.

   a. Grading - Grades on the areas to be topsoiled which have been previously established shall be maintained.

   b. Liming - Where the topsoil is either highly acid or composed of heavy clays, ground limestone shall be spread at the rate of 4-8 tons/acre (200-400 pounds per 1,000 square feet). Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedures.

   c. Tilling - After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by discing or by scarifying to a depth of a least 3 inches to permit bonding of the topsoil to the subsoil. Pack by passing a bulldozer up and down over the entire surface area of the slope to create horizontal erosion check slots to prevent topsoil from sliding down the slope.

2. **Topsoil Material and Application**

   Note: Topsoil salvaged from the existing site may often be used but it should meet the same standards as set forth in these specifications. The depth of topsoil to be salvaged shall be no more than the depth described as a representative profile for that particular soil type as described in the soil survey published by USDA-SCS in cooperation with Delaware Agricultural Experimental Station.

Source:	Symbol:	Detail No.
USDA - NRCS		DE-ESC-3.4.1 Sheet 1 of 2 Effective FEB 2019

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OPERATIONS:		
REVISION:		

CITY OF NEWARK
PUBLIC WORKS & RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: EROSION & SEDIMENT CONTROL DETAILS

SCALE: NTS

SHEET NO: 15 OF 17

DWG NO. 15

Topsoiling

Construction Notes (cont.)

a. Materials - Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay loam, loamy sand or other soil as approved by an agronomist or soil scientist. It shall not have a mixture of contrasting textured subsoil and contain no more than 5 percent by volume of cinders, stones, slag, coarse fragment, gravel, sticks, roots, trash or other extraneous materials larger than 1-1/2 inches in diameter. Topsoil must be free of plants or plant parts of bermudagrass, quackgrass, Johnsongrass, nutsedge, poison ivy, thistles, or others as specified. All topsoil shall be tested by a reputable laboratory for organic matter content, pH and soluble salts. A pH of 6.0 to 7.5 and an organic content of not less than 1.5 percent by weight is required. If pH value is less than 6.0 lime shall be applied and incorporated with the topsoil to adjust the pH to 6.5 or higher. Topsoil containing soluble salts greater than 500 parts per million shall not be used.

Note: No sod or seed shall be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed to permit dissipation of toxic materials.

b. Grading - The topsoil shall be uniformly distributed and compacted to a minimum of four (4) inches. Spreading shall be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations shall be corrected in order to prevent the formation of depressions or water pockets. Topsoil shall not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading and seedbed preparation.

Note:Topsoil substitutes or amendments as approved by a qualified agronomist or soil scientist, may be used in lieu of natural topsoil. Compost material used to improve the percentage of organic matter shall be provided by a certified supplier.

Compost amendments that are intended to meet specific post-construction stormwater management goals shall further meet the requirements of **Appendix 3.06.2 Post Construction Stormwater Management BMP Standards and Specifications, Section 14.0 Soil Amendments.**

Source:	Symbol:	Detail No.
USDA - NRCS		**DE-ESC-3.4.1** Sheet 2 of 2 Effective FEB 2019

Mulching

1. Materials and Amounts

a. *Straw* - Straw shall be unrotted small grain straw applied at the rate of 1-1/2 to 2 tons per acre, or 70 to 90 pounds (two bales) per 1,000 square feet. Mulch materials shall be relatively free of weeds and shall be free of noxious weeds such as; thistles, Johnsongrass, and quackgrass. Spread mulch uniformly by hand or mechanically. For uniform distribution of hand spread mulch, divide area into approximately 1,000 square feet sections and place 70-90 pounds (two bales) of mulch in each section.

b. *Wood chips* - Apply at the rate of approximately 6 tons per acre or 275 pounds per 1,000 square feet when available and when feasible. These are particularly well suited for utility and road rights-of-way. If wood chips are used, increase the application rate of nitrogen fertilizer by 20 pounds of N per acre (200 pounds of 10-10-10 or 66 pounds of 30-0-0 per acre).

c. *Hydraulically applied mulch* -The following conditions apply to hydraulically applied mulch:

i. Definitions:

a. Wood fiber mulch shall consist of specially prepared wood that has been processed to a uniform state, is packaged for sale as a hydraulic mulch for use with hydraulic seeding equipment, and consists of a minimum of 70% virgin or recycled wood fiber combined with 30% paper fiber and additives.

b. Blended fiber mulch shall consist of any hydraulic mulch that contains greater than 30% paper fiber. The paper component must consist of specially prepared paper that has been processed to a uniform fibrous state and is packaged for sale as a hydraulic mulch for use with hydraulic seeding equipment.

c. A bonded fiber matrix (BFM) consists of long strand, specially prepared wood fibers that have been processed to a uniform state held together by a water resistant bonding agent. BFMs shall contain no paper (cellulose) mulch but may contain small percentages of synthetic fibers to enhance performance.

d. Refer to **Figure 3.4.5a** for conditions and limitations of use for each of the above categories of hydraulic mulch.

ii. All components of the hydraulically applied mulches shall be pre-packaged by the manufacturer to assure material performance. Field mixing of the mulch components is acceptable, but must be done per manufacturers recommendations to ensure the proper results.

iii. Hydraulic mulches shall be applied with a viable seed and at manufacturer's recommended rates. Increased rates may be necessary based on site conditions.

iv. Hydraulically applied mulches and additives shall be mixed according to manufacturers recommendations.

iv. Materials within this category shall only be used when hydraulically applied mulch has been specified for use on the approved Sediment and Stormwater Plan, or supplemental approval from the plan approval agency has been obtained in writing for a specific area.

Source:	Symbol:	Detail No.
Delaware ESC Handbook & Filtrexx™ International		**DE-ESC-3.4.5** Sheet 1 of 3 Effective FEB 2019

Mulching

v. Application:

a. Apply product to geotechnically stable slopes that have been designed and constructed to divert runoff away from the face of the slope.

b. Do not apply to saturated soils, or if precipitation is anticipated within 24-48 hours.

c. During the spring (March 1 to May 31) and fall (September 1 to November 30) seasons, hydraulic mulches may be applied in a one-step process where all components are mixed together in single-tank loads. It is recommended that the product be applied from opposing directions to achieve optimum soil coverage.

d. During the summer (June 1 to August 31) and winter (December 1 to February 28) seasons, the following two-step process is required:

Step One– Mix and apply seed and soil amendments with a small amount of mulch for visual metering.

Step Two – Mix and apply mulch at manufacturers recommended rates over freshly seeded surfaces. Apply from opposing directions to achieve optimum soil coverage.

e. Minimum curing temperature is 40º F (4º C). The best results and more rapid curing are achieved at temperatures exceeding 60º F (15º C). Curing times may be accelerated in high temperature, low humidity conditions on dry soils.

vi. Recommended application rates are for informational purposes only. Conformance with this standard and specification shall be performance-based and requires **100% soil coverage**. Any areas with bare soil showing shall be top dressed until full coverage is achieved.

d. *Compost blanket (CB)* - Loosely applied with a pneumatic blower so that a 1" compost blanket uniformly covers the **soil with 100% coverage**. This application can be used with seed to promote germination by applying the approved seed mix directly into the loosely blown compost. The compost blanket performs best on slopes less than 2:1 and requires no mulch anchoring.

2. Anchoring mulch - Mulch must be anchored immediately to minimize loss by wind or water. This may be done by one of the following methods, depending upon size of area, erosion hazard, and cost.

a. *Crimping* - A crimper is a tractor drawn implement designed to punch and anchor mulch into the top two (2) inches of soil. This practice affords maximum erosion control but is limited to flatter slopes where equipment can operate safely. On sloping land, crimping should be done on the contour whenever possible.

b. *Tracking* - Tracking is the process of cutting mulch (usually straw) into the soil using a bulldozer or other equipment that runs on cleated tracks. Tracking is used primarily on slopes 3:1 or steeper and should be done up and down the slope with cleat marks running across the slope.

c. *Liquid mulch binders* - Applications of liquid mulch binders should be heavier at edges, in valleys, and at crests of banks and other areas where the mulch will be moved by wind or water. All other areas should have a uniform application of binder. The use of synthetic binders is the preferred method of mulch binding and should be applied at the rates recommended by the manufacturer.

d. *Paper fiber* - The fiber binder shall be applied at a net dry weight of 750 lbs/ac. The wood cellulose fiber shall be mixed with water, and the mixture shall contain a maximum of 50 lbs. of wood cellulose fiber per 100 gallons.

e. *Nettings* - Synthetic or organic nettings may be used to secure straw mulch. Install and secure according to the manufacturers recommendations.

Source:	Symbol:	Detail No.
Delaware ESC Handbook & Filtrexx™ International		**DE-ESC-3.4.5** Sheet 2 of 3 Effective FEB 2019

Mulching

MULCHING MATERIAL SELECTION GUIDE

Percent Slope	Type of Mulch / App. Rate*	Dec. 1 to Feb. 28(29)	March 1 to May 31	June 1 to Aug. 31	Sept. 1 to Nov. 30
Less than 2%	Blended Fiber @ 2000 lbs/ac minimum	xxxxxxxxxxxxxx	OK (1" inc.)	xxxxxxxxxxxxxx	OK (1" inc.)
	Wood Fiber @ 2000 lbs/ac min.				
	BFM @ 3000 lbs/ac min.	OK	OK	OK	OK
	Straw @ 2 Tons/ac. Min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)				
2% to 5.9%	Wood Fiber @ 2000 lbs/ac min.	xxxxxxxxxxxxxx	OK	xxxxxxxxxxxxxx	OK
	BFM @ 3000 lbs/ac min.	OK	OK	OK	OK
	Straw @ 2 Tons/ac. min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)				
6% to 10.9%	Wood Fiber @ 2400-2500 lbs/ac. min.	xxxxxxxxxxxxxx	OK	xxxxxxxxxxxxxx	OK
	BFM @ 3500-4000 lbs/ac. min.	OK	OK	OK	OK
	Straw @ 2 Tons/ac. min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)				
11% to 24.9%	Wood Fiber @ 2400-2500 lbs/ac. min.	xxxxxxxxxxxxxx	OK	xxxxxxxxxxxxxx	OK
	BFM @ 3500-4000 lbs/ac. min.	OK	OK	OK	OK
	Straw @ 2 Tons/ac. min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)				
25% to 33%	Wood Fiber @ 3500-3000 lbs/ac. min.	xxxxxxxxxxxxxx	OK	xxxxxxxxxxxxxx	OK
	BFM @ 4000 lbs/ac. min.	OK	OK	OK	OK
	Straw @ 2 Tons/ac. min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)				
33% and up	BFM @ 4000 lbs/ac. min.	xxxxxxxxxxxxxx	OK	xxxxxxxxxxxxxx	OK
	Straw @ 2 Tons/ac. min.**	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)	OK	2:1 Max.	2:1 Max.	2:1 Max.

* Note: Manufacturers Recommended Rates for informational purposes only. Performance standard requires 100% soil coverage.
** Note: Straw applied on slopes greater than 33% must be netted (this does not apply to topsoil stockpiles).
***Note: Straw applied on slopes greater than 33% must be netted (this does not apply to topsoil stockpiles).
OK = Acceptable to use during this time period
xxxxx = Not acceptable to use during this time period
All application rates are minimums.

Source:	Symbol:	Detail No.
Delaware ESC Handbook & Filtrexx™ International		**DE-ESC-3.4.5** Sheet 3 of 3 Effective FEB 2019

Vegetative Stabilization

TEMPORARY SEEDING BY RATES, DEPTHS AND DATES

Mix #	Species[6]	Seeding Rate		Optimum Seeding Dates [1] O = Optimum Planting Period; A = Acceptable Planting Period						Planting Depth[3]
				Coastal Plain			Piedmont			All
	Certified Seed	lb/Ac[5]	lb/1000 sq.ft.	2/1-4/30	[7] 5/1-8/14	8/15-10/31	3/1-4/30	[7] 5/1-7/31	8/1-10/31	10/31-2/1
1	Barley	125	4	O	A	O	O	A	O	1-2 inches 2-3" sandy soils
2	Oats	125	4	O	A	A	O	A	A	1-2 inches 2-3" sandy soils
3	Rye	125	4	O	A	O	O	A	O	A 1-2 inches 2-3" sandy soils
4	Perennial Ryegrass	125	4	O	A	O	O	A	O	0.5 inches 1-2" sandy soils
5	Annual Ryegrass	125	4	O	A	O	O	A	O	A 0.5 inches 1-2" sandy soils
6	Winter Wheat	125	4	O	A	O	O	A	O	A 1-2 inches 2-3" sandy soils
7	Foxtail Millet	30 PLS	0.7		O			O		0.5 inches 1-2" sandy soils
8	Pearl Millet	20 PLS	0.5		O			O		0.5 inches 1-2" sandy soils

1. Winter seeding requires 3 tons per acre of straw mulch for proper stabilization.
2. May be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
3. Applicable on slopes 3:1 or less.
4. Fifty pounds per acre of Annual Lespedeza may be added to 1/2 the seeding rate of any of the above species.
5. Use varieties currently recommended for Delaware. Contact a County Extension Office for information.
6. Warm season grasses such as Millet or Weeping Lovegrass may be used between 5/1 and 9/1 if desired. Seed at 3-5 lbs. per acre. Good on low fertility and acid areas. Seed after frost through summer at a depth of 0.5".

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 1 of 4 Effective FEB 2019

Vegetative Stabilization

PERMANENT SEEDING AND SEEDING DATES

Mix No.	Seeding Mixtures: Certified Seed[3] / Well Drained Soils	Seeding Rate[1] lb/Ac	lb/1000 sq.ft.	Optimum Seeding Dates [2] O = Optimum Planting Period; A = Acceptable Planting Period: Coastal Plain 2/1-4/30	Coastal Plain 5/1-8/14	Coastal Plain 8/15-10/31	Piedmont 3/1-4/30	Piedmont 5/1-7/31	Piedmont 8/1-10/31	All[4] 10/31-2/1	Remarks
1	Tall Fescue	140	3.2	A	O	A	A	O	A	Add 100 lbs./ac Winter Rye	Good erosion control mix Tolerant of low fertility soils Lovegrass very difficult to mow; Germinates only in hot weather
	Weeping Lovegrass	10	0.23								
2	Deertongue	30	0.69	A	O	A	A	O	A	Add 100 lbs./ac Winter Rye	Good erosion control mix Tolerant of low fertility soils Good wildlife cover and food
	Sheep Fescue	30	0.69								
	Common Lespedeza[5] Inoculated	15	0.35								
3	Tall Fescue (Turf-type) **or**	50	1.15	O	A	O	O	A	O	Add 100 lbs./ac. Winter Rye	Good erosion control mix Tall Fescue for droughty conditions. Creeping Red Fescue for heavy shade. Flatpea to suppress woody vegetation.
	Strong Creeping Red Fescue **or**	50	1.15								
	Perennial Ryegrass	50	1.15								
	plus Flatpea[5]	15	0.34								
4	Strong Creeping Red Fescue	100	2.3	O	A	O	O	A	O	Add 100 lbs./ac. Winter Rye	Suitable waterway mix. Canada Bluegrass more drought tolerant. Use Redtop for increased drought tolerance.
	Kentucky Bluegrass	70	1.61								
	Perennial Ryegrass **or**	15	0.35								
	Redtop	5	0.11								
	plus White Clover[5]	3	0.07								
5	Switchgrass[5,7] **or**	10	0.23		O			O			Native warm-season mixture. Tolerant of low fertility soils. Drought tolerant, Poor shade tolerance. N fertilizer discouraged - weeds
	Coastal Panicgrass	10	0.23								
	Big Bluestem	5	0.11								
	Little Bluestem	5	0.11								
	Indian Grass	5	0.1								
6	Tall Fescue (turf-type) (Blend of 3 cultivars)	150	3.5	O	A	O	O	A	O		Managed filter strip for nutrient uptake.
7	Tall Fescue	150	3.5	O	A	O	O	A	O		Three cultivars of Kentucky Bluegrass. Traffic tolerant.
	Ky. Bluegrass (Blend)	20	0.46								
	Perennial Ryegrass	20	0.46								
8	Big Bluestem[7]	10	0.23	O	A		O	A			All species are native. Indian Grass and Bluestem have fluffy seeds. Plant with a specialized native seed drill. Creeping Red Fescue will provide erosion protection while the warm season grasses get established.
	Indian Grass[7]	10	0.23								
	Little Bluestem[7]	8	0.18								
	Creeping Red Fescue	30	0.69								
	plus one of:										
	Partridge Pea	5	0.11								
	Bush Clover	3	0.07								
	Wild Indigo	3	0.07								
	Showy Tick-Trefoil	2	0.05								

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 2 of 4 Effective FEB 2019

Vegetative Stabilization

PERMANENT SEEDING AND SEEDING DATES (cont.)

Mix No.	Seeding Mixtures: Certified Seed[3] / Poorly Drained Soils	Seeding Rate[1] lb/Ac	lb/1000 sq.ft.	Optimum Seeding Dates [2] O = Optimum Planting Period; A = Acceptable Planting Period: Coastal Plain 2/1-4/30	Coastal Plain 5/1-8/14	Coastal Plain 8/15-10/31	Piedmont 3/1-4/30	Piedmont 5/1-7/31	Piedmont 8/1-10/31	All[4] 10/31-2/1	Remarks
9	Redtop	75	1.72	O	A	O	O	A	O	Add 100 lbs./ac. Winter Rye	Quick stabilization of disturbed sites and waterways
	Creeping Bentgrass	35	0.8								
	Sheep Fescue	30	0.69								
	Rough Bluegrass	45	1								
10	Reed Canarygrass[8]	10	0.23	A		O	A		O		Good erosion control, wildlife cover and wetland revegetation.
	Residential Lawns										
11	Tall Fescue	100	2.3	O	A	O	O	A	O		High value, high maintenance, light traffic, irrigation necessary. Well drained soils, full sun.
	Perennial Ryegrass	25	0.57								
	Kentucky Bluegrass Blend	30	0.69								
12	Tall Fescue	100	2.3	O	A	O	O	A	O		Moderate value, low maintenance, traffic tolerant.
	Perennial Ryegrass	25	0.57								
	Sheep Fescue	25	0.57								
13	Creeping Red Fescue	50	1.15	O	A	O	O	A	O		Shade tolerant, moderate traffic tolerance, moderate maintenance.
	Chewings Fescue	50	1.15								
	Rough Bluegrass	20	0.4								
	Kentucky Bluegrass	20	0.4								
14	Creeping Red Fescue	50	1.15	O	A	O	O	A	O		Shade tolerant, moisture tolerant.
	Rough Bluegrass **or**	90	2.1								
	Chewings Fescue										
15	K-31 Tall Fescue	150	3.5	O	A	O	O	A	O		Monoculture, but performs well alone in lawns. Discouraged.

1. When hydroseeding is the chosen method of application, the total rate of seed should be increased by 25%.
2. Winter seeding requires 3 tons per acre of straw mulch. Planting dates listed above are average for Delaware. These dates may require adjustment to reflect local conditions.
3. All seed shall meet the minimum purity and minimum germination percentages recommended by the Delaware Department of Agriculture. The maximum % of weed seeds shall be in accordance with Section 1, Chapter 24, Title 3 of the Delaware Code.
4. Cool season species may be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
5. All leguminous seed must be inoculated.
6. Warm season grass mix and Reed Canary Grass cannot be mowed more than 4 times per year.
7. Warm season grasses require a soil temperature of at least 50 degrees in order to germinate, and will remain dormant until then.

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 3 of 4 Effective FEB 2019

Vegetative Stabilization

Construction Notes:

1. Site Preparation

a. Prior to seeding, install needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, grassed waterways, and sediment basins.

b. Final grading and shaping is not necessary for temporary seedings.

2. Seedbed Preparation

It is important to prepare a good seedbed to insure the success of establishing vegetation. The seedbed should be well prepared, loose, uniform, and free of large clods, rocks, and other objectionable material. The soil surface should not be compacted or crusted.

3. Soil Amendments

a. Lime - Apply liming materials based on the recommendations of a **soil test** in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply dolomitic limestone at the rate of 1 to 2 tons per acre. Apply limestone uniformly and incorporate into the top 4 to 6 inches of soil.

b. Fertilizer - Apply fertilizer based on the recommendations of a **soil test** in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply a formulation of 10-10-10 at the rate of 600 pounds per acre. Apply fertilizer uniformly and incorporate into the top 4 to 6 inches of soils.

4. Seeding

a. For **temporary stabilization**, select a mixture from **Sheet 1** . For a **permanent stabilization**, select a mixture from **Sheet 2** or **Sheet 3** depending on the conditions. Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

b. Apply seed uniformly with a broadcast seeder, drill, cultipacker seeder or hydroseeder. All seed will be applied at the recommended rate and planting depth.

c. Seed that has been broadcast should be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used and the seed and fertilizer is mixed, they will be mixed on site and the seeding shall be done immediately and without interruption.

5. Mulching

All mulching shall be done in accordance with detail **DE-ESC-3.4.5**.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 4 of 4 Effective FEB 2019

MISS UTILITY of DELMARVA

BEFORE YOU DIG CALL 1-800-282-8555 (In Del.) or 1-800-441-8355 (Md., Va.) PROTECT YOURSELF, GIVE TWO WORKING DAYS NOTICE

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121 Continental Drive, Suite 300 Newark, DE 19713

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JAMES J. KELLEY — REGISTERED — No. 12162 — DELAWARE — PROFESSIONAL ENGINEER

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ENGINEER:	JJK	8-14-20
OPERATIONS:		
REVISION:		

CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: EROSION & SEDIMENT CONTROL DETAILS

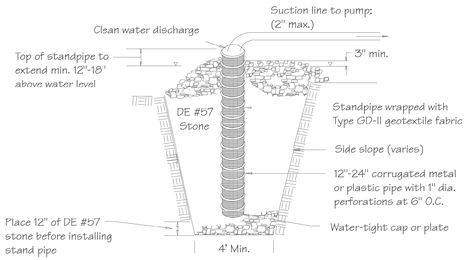
SCALE: NTS

DWG NO. 16

SHEET NO: 16 OF 17

Standard Detail & Specifications

Pumping Pit - Type 1



Section

Construction Notes:

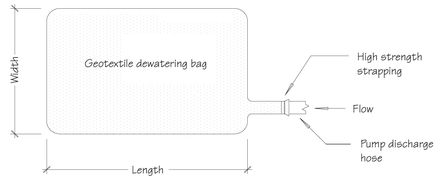
1. Pit dimensions are variable.
2. The standpipe should be constructed by perforating a 12" to 24" diameter corrugated or PVC pipe. The perforations shall be 1/2" X 6" slits or 1" diameter holes 6" on center.
3. A base of DE #57 aggregate should be placed in the pit to a depth of 12". After installing the standpipe, the pit surrounding the standpipe should then be backfilled with DE #57 aggregate.
4. The standpipe should extend 12" to 18" above the lip of the pit or riser crest elevation (basin dewatering).

NOTE: If discharge will be pumped directly to a storm drainage system, the standpipe must be wrapped with Type GD-II geotextile fabric before installation. If desired, 1/2" hardware cloth may be placed around the standpipe, prior to attaching the geotextile fabric. This will increase the rate of water seepage into the pipe.

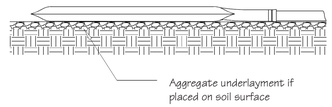
Source:	Symbol:	Detail No.
Adapted from MD Stds. & Specs. for ESC	PP-1	**DE-ESC-3.2.2.1** Sheet 1 of 1 Effective FEB 2019

Standard Detail & Specifications

Geotextile Dewatering Bag



Plan



Profile

NOTE: Pre-manufactured products installed in accordance with manufacturer's recommendations may be used as an equivalent substitute with Departmental approval.

Source:	Symbol:	Detail No.
Adapted from ACF Products, Inc.	GB	**DE-ESC-3.2.1.2** Sheet 1 of 2 Effective FEB 2019

Standard Detail & Specifications

Geotextile Dewatering Bag

Construction Notes:

1. The dewatering bag should be placed so the incoming water flows into and through the bag, and then flow off the site without creating more erosion. The neck should be tied off tightly to stop the water from flowing out of the bag without going through the walls. The dewatering bag should be placed on a gravel bed to allow water to flow in all directions.
2. The dewatering bag is considered full and should be disposed when it is impractical for the bag to filter the sediment out at a reasonable flow rate. At this point, it should be replaced with a new bag.
3. Disposal may be accomplished as directed by the construction reviewer. If the site allows, the bag may be buried on site and seeded, visible fabric removed and seeded or removed from site to a proper disposal area.

Materials:

1. The geotextile fabric shall be a Type GD-IV.
2. The dewatering bag shall be sewn with a double needle machine using high strength thread. All structural seams will be sewn with high strength, double stitched "J" type. Seam strength test will have the following minimum average roll values:

Type	TEST METHOD	TEST RESULT
Heavy duty	ASTM D-4884	100 lb / in

3. The dewatering bag shall have an opening large enough to accommodate a four (4) inch discharge hose with attached strap to tie off the hose to prevent the pumped water from escaping from the bag without being filtered.

Source:	Symbol:	Detail No.
Adapted from ACF Products, Inc.	GB	**DE-ESC-3.2.1.2** Sheet 2 of 2 Effective FEB 2019

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CHECKED BY:	JJK	8-14-20
ENGINEER:	JJK	8-14-20
OPERATIONS:		
REVISION:		

CITY OF NEWARK
PUBLIC WORKS & WATER RESOURCES DEPARTMENT
CULVERT REPLACEMENT - CURTIS LANE
CONTRACT NO. 21-04

SHEET TITLE: EROSION & SEDIMENT CONTROL DETAILS

SCALE: NTS

SHEET NO: 17 OF 17

DWG NO. 17